THE IRON AGE — July 20, 1933

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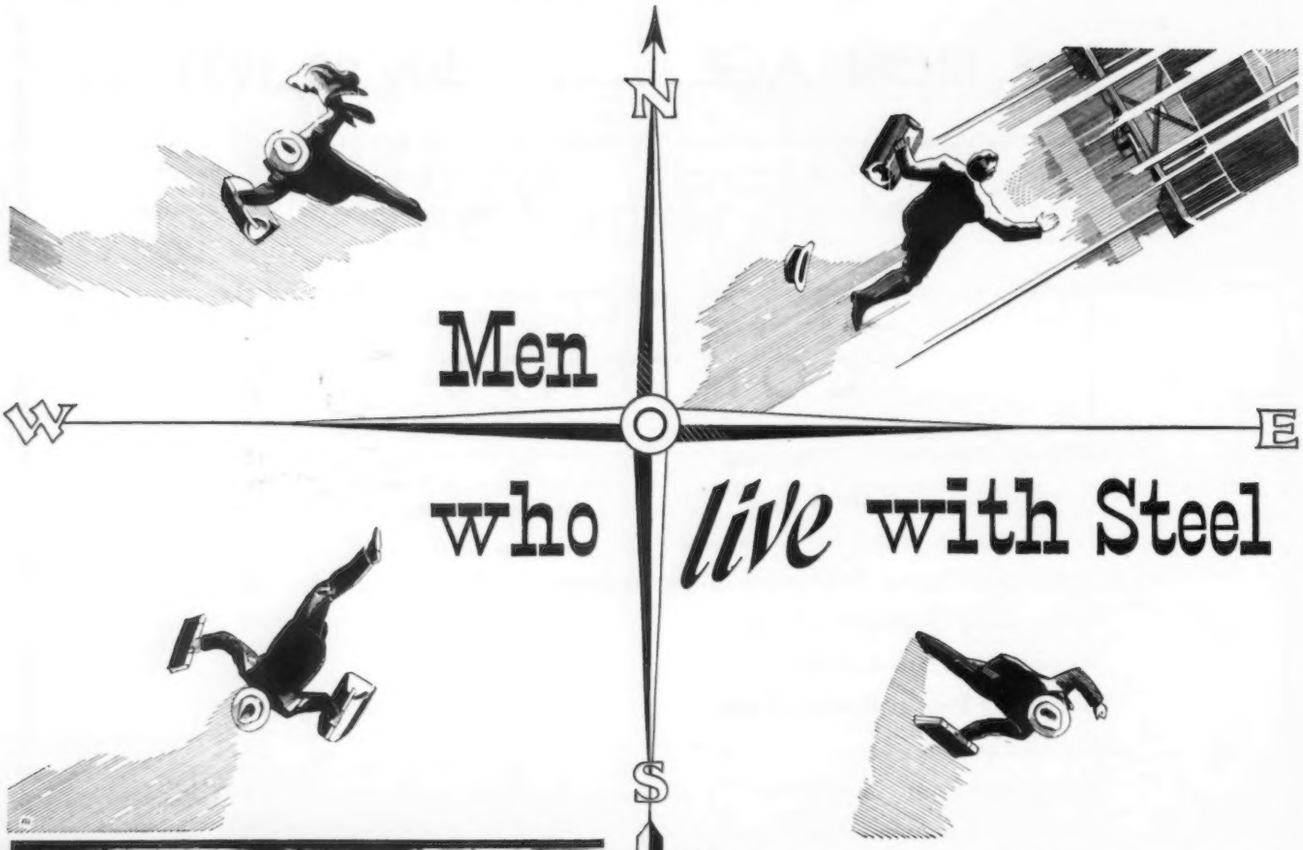

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BETHLEHEM *Fine* ALLOY STEELS

..THE IRON AGE..

JULY 20, 1933

ESTABLISHED 1855

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Industry Deserves No Spanking

CERTAIN public officials have shown a tendency to censure industry for slowness in submitting codes under the National Industrial Recovery Act.

Such censure is almost entirely unwarranted.

It was a mistake on the part of the Administration to assume in the first place that the complex ramifications of regional and other relations involved in agreement on hours and wages could be arrived at with such short consideration.

This by no means indicates that industry is antagonistic to the President's plans for a shorter work week and higher wages. We believe sincerely, and with our finger on the pulse of America's largest industry, that of the metal trades, that American industry has put and is putting more earnest, nonpartisan effort into efforts to effectuate the purposes of this plan than it has ever heretofore devoted to any single purpose.

The chief reason why the American business man is still in business is because he has insisted upon having at least some slight idea of where he is going before he starts on the way.

Editor, The Iron Age:

I PRESUME you have read carefully the speech delivered July 6, in New York, by Donald B. Richberg (chief counsel to General Johnson of the N.I.R.A. board). I refer particularly to the statements contained in the paragraphs beginning "The success of this Administration" and ending "or to serve selfish special interests."

As the official organ of our industry, you will no doubt take cognizance of these wild and illogical statements and incoherent scoldings, coming from a responsible spokesman of the Administration.

In effect, we are handed a set of blueprints of a new machine, designed by someone else, and told that if we cannot build it and make it run successfully, it is either because we are unwilling or incompetent!

I think it would be a mistake to sit down meekly under Mr. Richberg's words. It was a noted American who said "It is not by deference that men win their rights." And, most assuredly, it is not by deference to the outpourings of such minds as Mr. Richberg's that these rights be maintained.

(From a prominent metal-product manufacturer.)

If industry is expected to reorganize itself in two months' time from its long-time base of individualism to the new base of planned economy, it should not be admonished for asking questions or chided for delaying action when these questions are not clearly answered.

Industry has a right to know, for example, whether or not it waives its constitutional open shop rights by signing a code. Thus far, there has been no specific answer to this vital question.

Hundreds of other questions of importance to the industrialist who is at work upon code making remain unanswered. At best, he meets with generalities.

This is no criticism of the President's plan, or of General Johnson's earnest efforts to put it into effect. It would be as unfair to expect the hurriedly organized administrator's staff to be able to answer these questions as it is to expect industry to proceed intelligently without them.

Attempts, such as Richberg's, to spank industry for unavoidable delays are not likely to "effectuate" the President's plan.

Choosing th

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WHAT type of drive to use? This is the question confronting the plant manager, the designer and the engineer. What type of drive to suggest? This is the question confronting the sales engineer.

Much has been written and considerable research has been made on the comparative efficiencies and maintenance costs of the group and unit systems of driving, but in reality these comparisons are applicable to about one half of the mechanical driving of industry. They are useful to the plants utilizing numerous machine tools and small equipment because mechanical transmission complications seldom occur in this character of work. It is in process manufacturing plants that perplexing driving problems arise. In this field of industry, mechanical driving cannot be definitely segregated into the so-called group and unit systems.

During the past 18 months the author has refrained from writing on the subject of mechanical power transmission because the art has been in such a state of change that he considered it best to defer until the situation clarified. Numerous "don'ts" of the past decade are now common practice, because of new devices and the improvement of all appurtenances employed in the mechanical transmission of power. The belt of today will perform in a manner thought impossible a few years ago; chains are almost perfection; short center methods are numerous and the reduction gear is dependable and efficient.

Recent treatises on the subject of group vs. individual drive have defined in a convincing manner the spheres of economy of the shafting and belting group system as compared with the individual installation. The author from experience corroborates the facts stated, but this material does not assist the plant engineer in the driving of miscellaneous machinery not of the production shop class, the designer who must choose a transmission method for a new machine, nor does it assist the sales engineer who is desirous of suggesting a definite method of transmitting power. There is a need now for information in this direction. The transmission equipment sales engineer knows that he should be able to inform his customer on the proper method of driving, regardless of whether or not his particular company can supply such a method. Such action establishes confidence. The plant engineer knows that upon him rests the responsibility for either high maintenance and loss of power or efficient and economical power transmission. However, both are uncertain as to suggestion or choice chiefly because modern methods are at times so closely related that proper selection becomes extremely difficult. As examples—"where will I employ the chain drive and where the multiple V-rope drive; where the pivoted motor flat belt drive and where the short centre flat belt stationary motor drive?" The lines are drawn very close on these comparisons, yet in

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FIG. 1—Modernization of flat belting power transmission enables this power medium to compete favorably with all other methods for certain classes of driving.

g the Right Drive—1 ▲ ▲ ▲

By WILLIAM STANIAR
Mechanical Transmission Engineer
E. I. DuPont De Nemours & Co.

An Analytical Presentation of Modern Mechanical Transmission Methods

many instances the inherent characteristics of one would outclass those of the other for a particular installation.

Short Center Belts Now Practical

In certain past articles of the author, particular attention was called to the difficulties of the short centre flat belt drive. For drives of 75 to 100 h.p. a centre distance of not less than 14 to 18 ft. was advocated. That was based on the type of belt then available. Now the author sanctions driving an air compressor with a 14 in. flat leather belt from a stationary 100 h.p., 900 r.p.m. motor on a 57 in. center with an arc of contact of 138 deg. on the driving pulley. Something unheard of before the advent of high friction leathers. The perfection of belting of all types and the improvement in mechanical transmission equipment has made obsolete certain phases of mechanical power transmission theory. It is therefore imperative that the ingenious work of the belting and transmission equipment manufacturers during the past few years should be recognized. Such recognition will enable the consumer to avail himself of the transmission equipment now on the market. It will also reward the manufacturer in increased sales and satisfied customers.

Transmission equipment investment should write itself off in from three to five years in the form of lowered maintenance, decreased power consumption, and lengthened life. That is the reason the plant engineer hesitates unless he is familiar with the various characteristics of the modern methods of transmitting power mechanically. New installation driving is one problem, and the revamping of old driving methods is another. The latter is most in evidence today because the engineer is aware that antiquated methods of driving are costly as compared with what is available, but if the selection of the modern method is based simply on a favorable impression, the resulting operating cost may be higher than the old.

Group Drive Especially Adapted For "Production" Plants

The group driving method as generally known consists of a shaft from 15 to 75 ft. long driven by belt, chain or V-rope from a motor. From this line, batteries of low powered machines are driven by either chain or belt through countershafts or direct.

IS industry facing a "closed season" on "labor saving" machinery? For the sake of capital, labor and the public, we hope not. For through labor saving machinery, capital has been able to earn a profit, labor has been able to earn increased wages and the public has been able to buy more products at lower prices.

If the textile code is any criterion, it would seem as though obstacles were to be put in the way of those who endeavor to reduce their costs by decreasing the labor content of products. Therefore, it behooves management to scan the fields of economy which lie outside of the payroll.

One of the most fertile of these fields is that of mechanical power transmission. It is a universal factor, running through the length and breadth of the metal working industry. And it has been, comparatively, a neglected factor. Conditions will now force us to explore it thoroughly in pursuit of savings.

To this end, THE IRON AGE commences, in this issue, a thorough analytical study of mechanical power transmission methods by one of our foremost transmission engineers.

Industry may hunt for transmission economies the year around. There will be no "closed season."

The next article by Mr. Staniar will appear in THE IRON AGE of Aug. 17.

WILLIAM STANIAR

It is therefore obvious that this method is most applicable to quantity production plants or shops, because of the existence of machinery of this character. Compared with the individual motorizing of machinery of this type it has been conclusively proven that the group system from an installation, operating, maintenance, power consumption, power factor and efficiency standpoint is the most economical. In machinery of this class the actual problems of power distribution and control are integral with the machine itself. It is only necessary to drive the power input shaft. It will be observed from Figs. 1 and 2 illustrating typical production shop installations of the group method that it is not a transmission problem, rather it is one of suitable arrangement of machinery, shafting, and motors because the speeds, ratios, power demands, and atmospheric conditions are normal.

In the process manufacturing plant, such as the steel, dve, chemical, paint, cement, explosives, leather, mining industries, etc., the transmission of power mechanically is very different. It is difficult to make comparisons between the group and unit systems, because a combination of these two systems is generally required, based on high power requirements, a nonsimilarity of machinery and the individual driving demands of each piece of equipment. This necessitates the use of individual driving, but it cannot be compared to the individual motorized equipment of a production shop. The input speed of process plant machinery is usually slow and the power requirements high, therefore it is obvious that due to prohibitive dimensions of equipment, the generally termed "group system" of transmitting power cannot be employed.

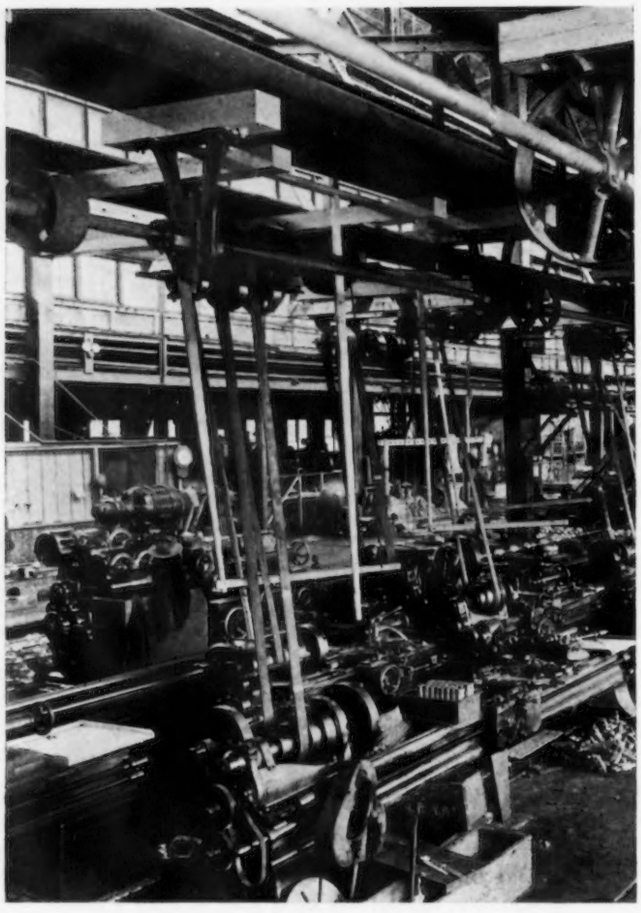


FIG. 2—Where atmospheric conditions are normal, the group method becomes a problem of the most suitable arrangement of machinery, shafting and motors.

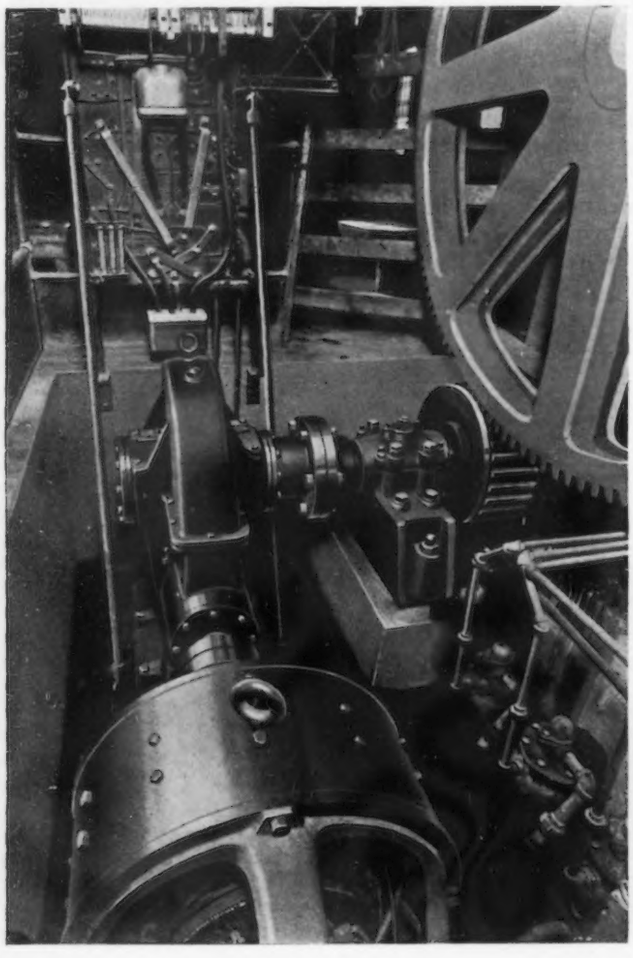
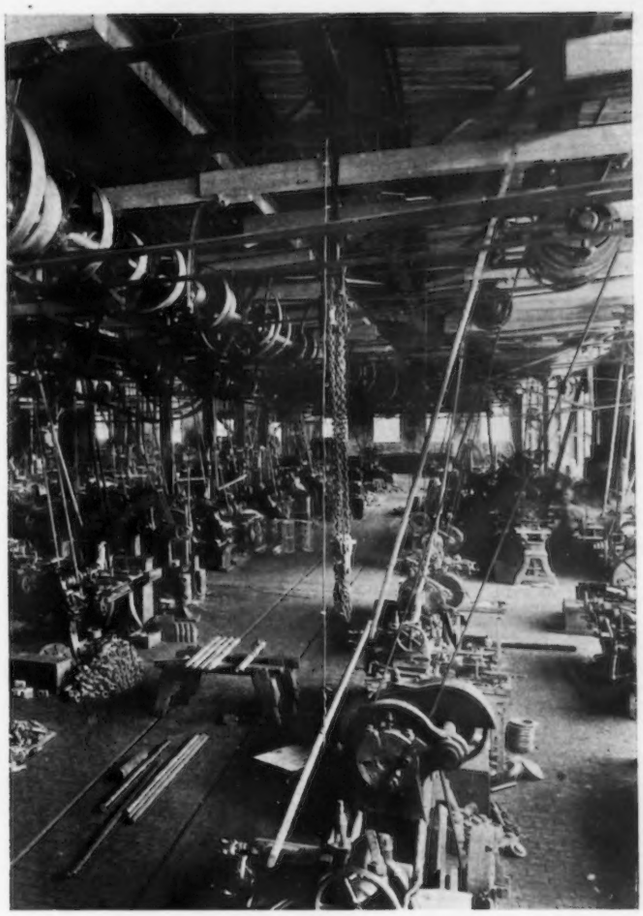


FIG. 3—Where power requirements are high and speeds low, neither direct connection nor group drive will suffice, for additional transmission equipment must be introduced between the motor and the machine.

If it is desired to drive a piece of equipment requiring 25 h.p. at an input shaft speed of 30 r.p.m. with available space for a 36 in. diameter pulley, it would be necessary to use a double leather belt 40 in. wide at 75 lb. effective tension. Assuming individual control necessary on a drive of this character, a clutch of huge proportions would be required because a belt 40 in. wide cannot be shifted. Therefore the fallacy of the group system for driving a machine such as this. It must be individually driven but not as the machine tool, because interposed between motor and machine additional transmission equipment is necessary to accommodate the speed and power requirements. This is illustrated by Fig. 3. Fig. 4 shows a battery of Edge mills in a wood pulp plant, each requiring 40 h.p. at an input speed of 50 r.p.m. to the pinion shaft, while Fig. 5 shows equipment requiring 30 h.p. at 2 r.p.m. driven by an 1800 r.p.m. motor with a combined



IN the "process" industries the transmission of power leans toward individual or combination drives.

spur and worm ratio of 860:1. These are examples of mechanical transmission problems that are of frequent occurrence in process industrial operations.

Unit Drive Requirements

Regardless of general savings possible by use of the shafting, belting and chain group system, certain classes of modern manufacturing equipment must be driven individually, therefore the demand for this type of mechanical transmission resolves itself almost totally into the unit drive with the possible exception of batteries of low powered steady speed apparatus. However, due to a similarity of power transmission equipment available it is frequently difficult to arrive at the most efficient and economical solution of the problem. In view of this situation an attempt will be made to describe the various methods of modern mechanical power transmission and to advise as to their proper adaptation and uses.

Modern mechanical transmission of power may be classified into two general systems—namely, the flexible and the rigid.

The Flexible System

1—Group method—employing shafting and belting
2—Group method—employing shafting and chain
3—Chain method—direct
4—Multiple V-rope method
5—Pivoted motor method
6—The variable speed unit method

The Rigid System

1—The direct coupled motor method
2—The vertical worm gear reduction unit method
3—The horizontal worm gear reduction unit method—single and compound
4—The spur gear reduction unit method—planetary and non-planetary
5—The herringbone reduction unit method
6—The horizontal and vertical motorized reduction unit method
7—The open direct geared method
8—The combination method

In considering the two general systems there are certain fundamentals of demand and operation that tend to determine which of the two should be employed. After such a determination of system is reached it is necessary to select the method of the system most adaptable to the specific requirements. In some instances the method characteristics so closely parallel each other that selection is difficult. Based on this fact each method of each system will be discussed.

The Flexible System

All methods of the "flexible system" are to a certain extent shock absorbing and tend to eliminate vibration transference to the motor or prime mover. This is particularly true with the group shafting and belting, the V-rope, and the pivoted motor methods. Another attribute of these three methods is their inherent characteristic of slip, which to some classes of driving is a necessary protection.

The group method, employing shafting and belting as shown by Fig. 1, modernizes the transmission of power by flat belting, thus enabling this power medium to compete favorably

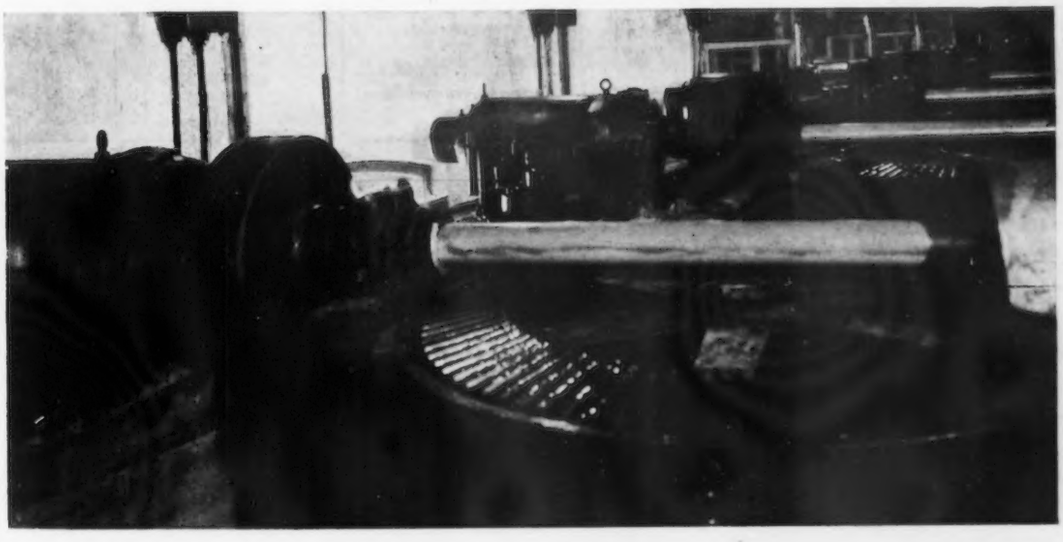


FIG. 4—Wood pulp plant drive requirements of 40 hp. and 50 r.p.m. of the pinion shaft are solved by means of this massive but compact all geared drive.

with all other methods for certain classes of driving. The possibility of belting functioning in this manner has been brought about by the electric motor. Before the advent of the motor, grouping was not possible, therefore no difficulty was involved in determining the method of driving. There was only one alternative, the use of shafting and belting driven from one remotely located prime mover. The motor makes possible the segregation of power distribution into convenient sections or groups.

Modern group driving employing shafting, bearings, hangers and belting may be installed so as to furnish low or high ratios from motor to driven equipment. The two methods usually employed in production shops are shown by Fig. 6. "A" shows the line group with a possible maximum ratio of 16:1, while "B" shows the line and countershaft group with a possible maximum ratio of 64:1. Ratios as high as 64:1 are seldom necessary owing to the usually high input speed to the driven production tool. The arrangement of group driving usually employed in process plants is shown by Fig. 7 and is known as the head- and line-shaft group capable of furnishing a possible maximum ratio of 80:1. In this class of industry, ratios such as this are frequently necessary where the group method of driving is practicable because of the slow input speed of the driven apparatus. In production shop group driving the line is usually from 50 to 75 ft. long, and the countershaft if employed is of sufficient length to accommodate the necessary pulleys from the line and to the machine. In process plant group driving the head-shaft is of sufficient length to accommodate the receiving pulley from the motor and the driving pulley to the line. The line is usually from 50 to 75 ft. in length.

Batteries of Small Machines

This method should be employed in both production shops and process manufacturing plants where batteries of small machines or apparatus are to be driven requiring not over 5 h.p. per machine, and where it is possible to group such machinery so that the maximum power demand on the prime mover does not exceed 50 to 75 h.p. If this demand is exceeded, based on economical speeds for line shafting, the transmission equipment dimension

PROCESS MANUFACTURING PLANT DRIVING

METHOD	Group Shafting and Belting			
SERVICE	Driving two and not more than 5 low powered, moderate speed units. Where space is available for proper belt drive centre distance. Where control by tight and loose pulleys is possible. Where proper type transmission equipment is used for the atmospheric conditions involved.			
BELTING TYPE AND JOINING.	**Location**	**Belting**	**Atmospheric Conditions**	**Joining**
	Motor to Head-shaft.	Mineral retan leather.	Normal.	Endless.
		Extra dressed mineral retan leather.	Acid fumes and temperatures.	Endless.
		Mineral retan leather.	Damp, steam, moisture.	Endless.
		High grade stitched canvas. Solid woven cotton. Balata or rubber.	Dust and grit under dry conditions.	Endless or metallic.
	Head-shaft to Line-shaft.	Regular oak tanned leather. Balata, rubber, stitched canvas or solid woven cotton.	Normal.	Metallic.
		Reinforced copper stitched with special friction compound. Solid woven hair. Asbestos filled stitched canvas.	Acid fumes and temperatures.	Special acid resisting metallic.
		Waterproof oak tanned leather. Regular or light weight duck type of rubber. Balata, cotton woven or stitched. Solid woven hair.	Damp, steam moisture.	Metallic.
		Rubber.	Dust and grit under dry conditions.	Metallic.
	Line-shaft to Apparatus. T. & L. Pulley Control.	Regular oak leather. Combination tannage leather. Rubber. Balata. Solid woven cotton. Stitched canvas.	Normal.	Metallic.
		Combination tannage leather (extra dressed). Reinforced copper stitched with special friction compound. Solid woven hair. Asbestos filled stitched canvas.	Acid fumes and temperatures.	Special acid resisting metallic.
		Waterproof oak leather. Combination tannage leather. Regular or light weight duck type of rubber. Balata. Cotton woven or stitched. Solid woven hair.	Damp, steam moisture.	Metallic.
		Rubber, Balata.	Dust and grit under dry conditions.	Metallic.

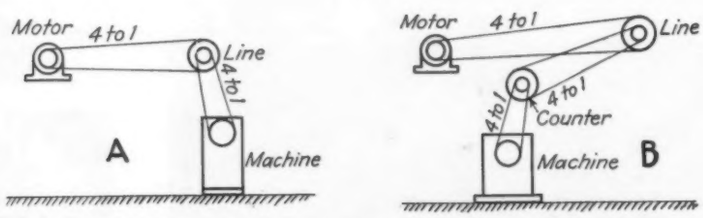


Fig. 6—Group driving may furnish either low or high ratios from motor to machine. At A is shown a line group with a possible ratio of 16 to 1, while B shows a line and countershaft drive with a possible maximum of 64 to 1.

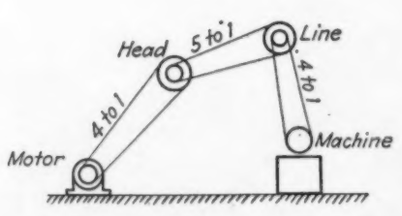


Fig. 7—Above is the arrangement of group drive usually employed in process plants. It is capable of furnishing a maximum ratio of 80 to 1.

PROCESS MANUFACTURING PLANT DRIVING (Continued)

	Shaft	Types	Spacing
BEARINGS	Head-shaft.	Self oiling babbitted or anti-friction. Bearings of the solid rigid type are preferable.	For this shaft two and not more than three bearings should be used. Use adjustable base plates. Maximum centres = 7′0″.
	Line-shaft.	Self oiling babbitted or anti-friction. Support in adj. hanger frames or ball and socket pillow blocks. Split type of bearing is preferable.	Close to power receiving and delivery pulleys and not to exceed 8′0″ centres. Closer depending on dead load and belt pull.

	Atmospheric Condition	Material	Types
PULLEYS	Normal.	Steel, cast iron, wood or paper.	Solid or split. Keyed or clamped.
	Acid fumes.	Cast iron.	Solid or split keyed.
	Damp, steam, moisture.	Cast iron.	Solid or split. Keyed or clamped.
	Dust and grit under dry conditions.	Steel, cast iron or wood.	Solid or split. Keyed or clamped.

	Material	Diameter and Lengths
SHAFTING	Cold rolled steel. Nickel steel. Forged steel. Ground and polished steel. Chrome Vanadium steel.	1 1/4″ to 6″ diameter. 6′ to 75′ long.

HORSEPOWER CAPACITIES	Maximum running load for individual equipment = 7 H.P. Maximum size of motor for group = 75 H.P. at all standard motor speeds.
MAXIMUM RATIOS	Motor to head-shaft = 4:1. Head-shaft to line-shaft = 5:1. Line-shaft to machine = 4:1. Total = 80:1.

	Head-shaft	Line-shaft
SPEEDS OF SHAFTING	150 to 450 R P.M.	80 to 350 R P.M.

PRODUCTION SHOP DRIVING

METHOD	Group Shafting and Belting
SERVICE	Driving two or more low powered machine tools, where space is available for proper belt drive centre distances. Where control to machine is by T. & L. pulleys, clutch or stepped cone pulleys. Under normal atmospheric conditions.

	Location	Belting	Method of Joining
BELTING TYPE AND JOINING	Motor to line.	Mineral retan leather.	Endless.
	Line to machine. If T. & L. pulley or stepped cone controlled.	Combination tanned leather. Place mineral retan side to pulley.	T. & L. pulley control. Metallic. Stepped cone control. Rawhide lace.
	Line to machine. If clutch or no control.	Regular oak tanned leather or fabric.	Metallic or rawhide lace.
	Line to machine counter. If T. & L. pulley controlled.	Combination tanned leather or fabric.	Metallic.
	Line to machine counter. If clutch or no control.	Regular oak tanned leather or fabric.	Metallic.
	High speed, small pulley drive to machine.	Mineral retan leather.	Endless.

	Types	Spacing
BEARINGS	Self-oiling babbitted, or anti-friction. Support in adj. hanger frames. Bearing either split or solid.	Close to power receiving and delivery pulleys and not to exceed 8′0″ centres. Closer depending on dead load.

	Material	Types
PULLEYS	Cast iron, steel or wood.	Solid or split keyed. Split clamped.

	Material	Diameter and Length
SHAFTING	Cold rolled steel.	Maximum 2 1/4″ dia. 75′ long.

HORSEPOWER CAPACITIES	Maximum running load for individual machines = 5 H. P. Maximum size of motor for group—50 H. P. at all standard motor speeds.
MAXIMUM RATIOS	Motor to line = 4:1. Line to machine = 4:1. Total 16:1.
	Motor to line = 4:1. Line to counter = 4:1. Counter to machine = 4:1. Total = 64:1.

	Line-shaft	Counter-shaft
SPEEDS OF LINE AND COUNTER-SHAFTS	150 to 400 R. P. M.	200 to 500 R. P. M.

becomes prohibitive. Power is one of the basic economies when the group system is applied to batteries of small machines. The group shafting and belting method of driving a battery of machines requires less total power than a direct-motor-connected battery of similar machines. The starting load on each machine is always greater than the running load, therefore each machine individually motorized requires a motor equivalent in power capacity to its starting load. The group method can be motorized equivalent in power to a multiple of the machine running loads, plus a slight margin for line bearing friction, because if desirable each machine can be started separately. The efficiency of a motor is highest when it is operating at or near its rated capacity. When selecting the size of a motor to drive a group of machines see that equipment of large power requirements and of infrequent operation are not placed in group with machines requiring light or medium power. The power capacity of a motor direct connected to a machine should be slightly in excess of the power required to start the load. This fact is of small consequence where one or two small machines are involved but it is appreciable when applied to batteries, because the charge for power is partially based upon the demand and power factor in addition to the load rate. The demand charge must be paid regardless of whether the machines are operating or idle. A low power factor is "inefficiency" and is caused by over-motored machinery. Such a condition is a loss, because the consumers of electric current are penalized by the power companies if the power factor drops below a certain set figure.

Input speeds and atmospheric conditions usually cause a difference in the driving characteristics of small machinery employed in the production shop and process plant, therefore the group method must be designed accordingly.

In the driving of production tools by this method, based on the usually high input speeds of the machines, a motor belted to a line-shaft and the line-shaft belted to the machine is sufficient. The counter-shaft which is generally furnished as a component part of a machine tool functions chiefly as a means of control and reverse rotation action, not as a means of speed reduction. Atmospheric conditions are normal, therefore standard transmission equipment can be employed without concern as to premature failure.

Special Requirements of "Process" Plants

In process plants the situation is different, because of slow input speeds and in many instances atmospheric conditions that are destructive to transmission equipment and particularly to belting. Based on the economy

of high speed motors and the necessity of operating process plant group line-shafts at comparatively slow speeds, the usual practice is to interpose a shaft between the motor and the line-shaft, known as a "head-shaft." This allows a total practicable ratio from motor to line of 20:1, which in turn can furnish a total ratio of 80:1 from motor to final input speed demand. The interposing of a counter-shaft between line-shaft and machine for added reduction is seldom employed, since when the required total ratio exceeds 80:1 direct connection through a reducing mechanism should be resorted to, as the maintenance and space factors then overbalance the power economies of the group method.

From an atmospheric standpoint primary consideration must be given the motor. In some instances inflammable vapors, fine dust or lint are present which prevent the use of the ordinary squirrel cage motor. This necessitates separating the motor from these conditions, but if not practicable the explosion proof type for the inflammable vapor condition and the totally enclosed type with duct connections to the outside for the dust and lint conditions must be employed. In other cases the atmosphere may be charged with acid mists or vapors which materially shorten the life of the transmission equipment unless proper selection is made. For such conditions, enclosed bearings, cast iron pulleys, and correct belting type for the particular acid fume involved should be employed. For specific information as to the type of belting to employ for various acid conditions, reference is made to the author's book entitled "Mechanical Power Transmission."

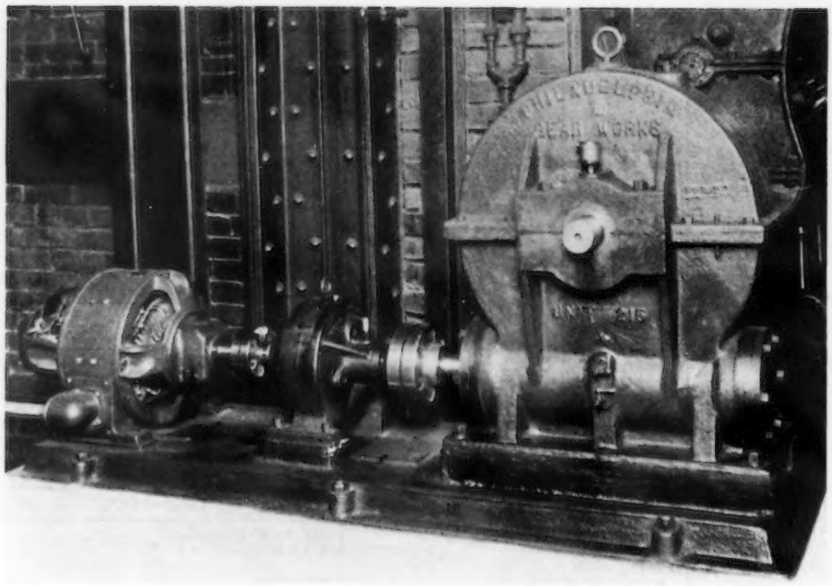


Fig. 5—A ratio of 860 to 1 is given, with a motor speed of 1800 r.p.m. and an output of 30 hp. at 2 r.p.m through this combination spur and worm reduction.

To summarize the application and standard characteristics of the group method employing shafting and belting for both production shops and process plants the accompanying tabulations are given. Similar tables will accompany the presentation of each of the other transmission methods in subsequent chapters.

New Materials from the User's Standpoint

PRODUCT engineers are sometimes several years behind the procession in the matter of adapting both present materials and newly available materials to economic use, according to J. L. Alden, Western Electric Co., Chicago, who addressed the meeting of the American Society of Mechanical Engineers in that city on the subject of "Substitution of Different Material in a Product."

Materials are a fundamental of industry in the sense that practically all activity is concerned directly or indirectly with production and adaptation of materials. The two great accelerators of advances in the uses and changing uses of engineering materials are the research laboratories on the one hand and the demand for consumables and enjoyment of material benefits on the other. Research laboratories have found multitudes of new materials; yet to any one industry very few really new engineering materials, useful to that industry and capable of genuinely different applications, appear to be available. Some of the valuable materials which have recently become available are the new high-strength, corrosion-resisting steels, improved synthetic plastics, the precipitation-hardened non-ferrous metals and alloys, the high-strength cast irons, the magnesium and beryllium alloys, high-strength glass and ceramic materials, and the almost perfectly pure metals for commercial use.

It is indicated, further, that the factors of industrial production may be considered as being in the form of an equation, and that if the material factor is altered the others will be affected or should be altered, to varying degrees, to assure maintenance of the desired balance between these factors, and cost and quality. It is perhaps seldom that all of the considerations likely to be associated with material substitutions will be important in any one case, but each must be thoroughly investigated to insure the success of the substitution.

The degree to which material-substitution engineering can be carried on profitably varies considerably, depending upon the types and varieties of products manufactured. In the manufacture of products such as automobiles and telephone equipment, in which large varieties as well as large quantities of materials are used, very considerable savings can be realized as a result of continually directing engineering investigation against the material factor in costs. The importance of the material factors as reflected in the cost sheets determines how much action is justified, granted that the quality is satisfactory.

Long-time planning of material substitutions is extremely advisable in cases where large purchases normally are made and buying contracts are in effect. It is recognized that in many industries very quick changes must be made for styling, but it is seen that raw material substitutions made as a result of long-time planning and investigation are generally more profitable than changes made hastily from a sales standpoint. Engineers commonly think in terms of the properties of materials which are available to their purposes, but in so doing the

(*Concluded on Page* 58)

Speculative Buying in the Metal-Working Industry

An Original Survey by The Iron Age

SUPPLEMENTING the original survey conducted by The Iron Age on the increase of business in the metal-working field (published in our issues of June 29 and July 6), the question was raised as to how much of this increased activity was due to "speculative" buying, or manufacturing for stock, in excess of orders.

To intelligently answer this question, an additional survey was necessary. The results of this survey are published in the following pages. In order that it might be entirely representative, it was made anonymously, care being taken that the identity of replying concerns remained unknown, even to our own editors.

This survey indicates that materials are being purchased further in advance than was the case prior to May 1. This represents an approach to normal practice in buying materials rather than speculative buying.

The increase in manufacturing operations in most cases conforms to the increase in orders with reasonable allowance for building up depleted stocks to a point justified by the present volume of sales.

Regarding the stocking up by dealers, a hardware sales manager who had just comcompleted a swing around the country reported that dealers are building up their stocks slightly because they were far below normal. In the Middle West dealers are not stocking to the extent that orders would indicate. He also reported that consumer buying in the hardware line has improved throughout the country, excepting a few places in the East—particularly New York City.

This is the first survey of this sort, to our knowledge, yet undertaken. The results should be of interest to manufacturers, merchandisers and also to the authorities of the National Recovery Board. It deals in facts, not suppositions.

Product	Materials Purchases Now Anticipating Orders by:	Materials Purchases Anticipated Orders Prior to May 1, by:	Manufacturing for Stock in Excess of Orders or Normal Practice?	Increase in Manufacturing as Compared with Increase in Orders		Are Dealers Increasing Stocks Materially?
				Mfg. Increase	Order Increase	
Screw Machine Products	3 Weeks	10 Days	No	60%	65%	No
Metal Specialties	4 Months	2 Months	No	....	25%	No
Castings and Forgings	3 Weeks	1 Week	Yes	20%	10%	No
Bolts and Nuts	10 Weeks	6 Weeks	Yes	50%	47%	Yes
Air Conditioning Equipment	8 Weeks	4 Weeks	No	10%	10%	No
Hand Tools	6 Months	3 Months	No	....	....	No
Wire Cloth, Nails	0	3 Months	No	....	....	Yes
Small Machine Tools	2 Months	2 Months	No	28%	40%	Yes
Bolts and Nuts	3 Months	3 Months	No	....	....	No
Machinery	0	0	No	....	....	...
Piston Packing Rings	3 Months	3 Months	No	25%	29%	No
Bolts and Nuts	3 Months	2 Weeks	No	Orders Exceed Mfg.		Yes
Building Material	1 Month	1 Month	No	....	....	No
Threading Dies	As Needed	As Needed	No	....	....	No
Bolts and Nuts	30 Days	30 Days	No	....	....	No
Drop Forgings	3 Weeks	10 Days	No	....	....	No
Machinery	1 Month	1 Month	No	....	....	...
Hardware	3 Months	3 Months	No	....	....	Yes
Pumping Machinery	3 Months	3 Months	No	Product Made to Order		...
Elevators	3 Weeks	3 Weeks	No	....	....	...
Electrical Products	2 Months	1 Month	Yes	40%	34%	No
Forgings	3 Months	1 Month	No	....	....	...
Machine Tools	2 Weeks	2 Weeks	No	....	....	No
Screw Machine Products	2 Weeks	2 Weeks	No	....	....	No
Machine Tools	4 Weeks	From Stock	No	....	....	Yes
Auto Service Equipment	3 Weeks	3 Weeks	No	....	....	No
Valves and Radiators	3 Months	3 Months	No	....	....	No
X-Ray Apparatus	As Needed	As Needed	No	....	140%	No
Pig Iron	2 Weeks	2 Weeks	No	....	....	No

Product	Materials Purchases Now Anticipating Orders by:	Materials Purchases Prior to May 1 Anticipated Orders by:	Manufacturing for Stock in Excess of Orders beyond Normal Practice?	Increase in Manufacturing as Compared with Increase in Orders		Are Dealers Increasing Stocks Materially?
				Mfg. Increase	Order Increase	
Rivets, Upset Forgings	2 Months	2 Weeks	No	....	40%	No
Metal Furniture	3 Months	1 Month	No	....	....	No
Vacuum Cleaners	3 Months	3 Months	No	....	....	No
Oil Burners	2 Months	2 Months	Yes	50%	50%	No
Printing Machinery	Very Little Change		No	....	....	No
Boilers	As Needed	As Needed	No	....	50%	No
Electrical Products	3 Months	3 Months	No	....	....	A Few Are
Electric Lamps	4 Weeks	0	No	....	....	No
Stampings	4 Months	1 Month	No	....	....	No
Clutches	Purchases Conform To Sales		No	....	....	No
Brass and Products Made Therefrom	4 Weeks	4 Weeks	No	....	....	No
Hack Saw Blades	3 Months	3 Months	No	....	....	No
Power Transmission Apparatus	0	0	No	....	....	No
Rubber Machinery	4 Weeks	10 Days	No	....	....	No
Stampings	1 Month	1 Month	No	....	....	No
Machinery	8 Weeks	As Needed	Yes	15%	5%	No
Pumps, Engines	0	30 Days	No	....	....	....
Axes, Picks, Hoes	3 Months	2 Months	No	....	....	No
Auto Hardware	2 Months	1 Month	Yes	15%	5%	Yes
Furnaces	As Needed	As Needed	No	....	....	No
Bearings	3 Weeks	3 Weeks	No	....	....	No
Steam Specialties	4 Months	4 Weeks	No	....	300%	No
Springs	As Needed	As Needed	No	....	....	No
Machinery	No Change In Policy		No	....	38%	No
Crushing Machinery	1 Month	1 Month	No	....	....	No
Gas-Fired Boilers	1 Week	2 Weeks	No	....	....	No
Valves	3 Months	2 Months	No	50%	50%	No
Mining Tools	3 Months	3 Months	No	20%	20%	No
Tools	As Needed	As Needed	No	....	....	No
Non-ferrous Castings	3 Months	1 Month	No	....	30%	....
Lock Washers	5 Weeks	2 Weeks	No	....	....	No
Stampings	4 Weeks	4 Days	No	....	....	No
Machinery	1 Month	1 Month	No	....	....	No
Electric Motors	1 Month	1 Month	No	....	220%	No
Electrical Machinery	As Needed	As Needed	No	....	....	....
Switches	1 Month	1 Month	No	....	....	No
Compressors, Pumps	3 Months	0	No	....	100%	No
Hand Tools	3 Months	2 Weeks	No	150%	150%	Yes
Hydraulic Presses	As Needed	As Needed	No	5%	10%	No
Gears	As Needed	As Needed	No	....	Yes	Yes
Motor Starters	3 Months	6 Days	No	200%	300%	No
Ball Bearings	7 Weeks	7 Weeks	No	....	....	No
Electrical Supplies	6 Months	2 Months	No	50%	50%	No
Ice Machinery	6 Months	3 Weeks	No	Same Ratio		No
Springs	2 Weeks	2 Weeks	No	Same Ratio		No
Roll Forming Machinery	4 Days	4 Days	No	....	....	No
Machine Screws	6 Weeks	3 Weeks	No	....	....	No
Boilers	0	0	No	....	....	....
Heavy Hardware	0	0	No	....	....	No
Textile Machinery	1 Month	1 Week	No	....	....	No
Ball Bearings	4 Weeks	4 Weeks	No	....	....	No
Machine Tools	0	2 Months	No	....	....	No
Machine Tools	0	0	No	....	....	No
Hack Saws	2 Months	2 Weeks	Yes	60%	50%	Yes
Small Tools	6 Months	2 Months	Yes	200%	100%	No
Steam Turbines	1 Month	1 Month	No	....	....	....
Steel Office Partitions	0	0	No	....	....	....
Machine Tool Accessories	2 Weeks	1 Week	Yes	60%	50%	No
Numbering Machines	1 Month	1 Month	No	....	10%	No
Electrical Appliances	3 Weeks	3 Weeks	No	....	....	No
Perforated Metals	4 Weeks	2 Weeks	No	....	....	No
Grease Cups	3 Months	3 Months	No	20%	25%	No
Builders Hardware	3 Weeks	2 Weeks	No	....	....	No
Bolts and Nuts	3 Weeks	3 Weeks	Yes	....	100%	Yes
Roller Bearings	3 Weeks	6 Days	No	....	....	No
Boilers, Engines	4 Weeks	2 Weeks	No	....	10%	No
Air Filters	6 Months	2 Weeks	No	....	....	No
Springs	As Needed	As Needed	No	....	50%	....
Portable Electric Tools	2 Months	2 Months	No	....	50%	No
Power Presses	4 Days	4 Days	No	....	....	No
Cutting Tools	As Needed	As Needed	No	....	....	No
Steel Balls	3 Months	1 Month	No	50%	50%	No
Transmission Chain	1 Month	1 Week	No	....	35%	No
Tools	8 Weeks	4 Weeks	No	....	....	No
Steam Power Machinery	As Needed	As Needed	No	....	....	No
Electroplating Equipment	3 Months	1 Month	No	100%	100%	No
Engines, Gasoline	3 Months	1 Month	No	....	30%	No
Auto Accessories	4 Months	1 Month	No	....	....	Yes
Equipment	0	0	No	45%	45%	No
Pulleys	3 Months	1 Month	No	Orders Exceed Mfg.		No

To Be Continued in Next Issue

Performance of Stainless Steels

By MARCUS A. GROSSMANN
Research Engineer, Illinois Steel Co.

THE use of 17 per cent chrome steel on an extensive industrial scale was owing to its resistance to nitric acid. It was soon recognized, however, that it had other useful properties as well—particularly resistance to oxidation at high temperatures, and good strength at somewhat elevated temperatures.

Tubing of Chromium Steel

It seemed that these properties would be useful for distillation tubes in oil-cracking stills for making gasoline, and also as superheater tubes in boilers. The making of seamless tubes was therefore undertaken, and with unexpectedly prompt success. The success in piercing the tubes was the more unexpected because it was necessary to make very marked modifications in the practice, on account of the then unfamiliar properties of the steel. But the manufacture was soon on a production basis and it was not long before many thousands of tubes were in service, and were establishing very high efficiences in high-temperature processes.

With such satisfactory service, it was unfortunate that a condition came to light which must be avoided in this particular application. There is a narrow range of temperature in the immediate neighborhood of 900 deg. F., where this particular type of steel becomes brittle upon long exposure. This was discovered when the tubes were cooled for cleaning. They began to break when scrapers were used to remove incrustations of carbon. The condition is still unexplained.

It is common to all the straight chromium, high-chromium steels, and is more pronounced the higher the chromium. Thus 27 per cent chrome steels show it markedly, 21 per cent chrome steels less so, 17 per cent chrome steels show it to some extent, and it has been found even in the 12 per cent chrome steels. The moral is "Avoid straight-chromium (high-chromium) steels for long exposure in the immediate neighborhood of 900 deg. F." It should be pointed out that steels which have become brittle in this manner may be made tough again by heating to above the dangerous range.

Tubing of 18-8 Steels

Steels containing 18 per cent chromium and eight per cent nickel were then discovered to have better strength at elevated temperatures than the 17 per cent chrome steel and the oxidation resistance and corrosion resistance were at least as good. It therefore seemed promising as a material to replace the failed 17 per cent chrome steel in the above described oil-cracking service.

It was first necessary to develop a new technique for piercing the seamless tubes of 18-8, but this was soon done. The tubes were then put in service, and showed that they were capable of long and satisfactory life. The 900 deg. brittleness was no longer a source of concern. The toughness of the 18-8 was entirely satisfactory. The steel was so satisfactory in other respects, also, such as workability and ease of fabrication, that it has now become a standard steel for oil-cracking service. It is widely used for this purpose today and is the preferred steel in many gasoline refineries, functioning well in the tendency toward higher and higher temperatures.

It should be mentioned that 18-8 has one drawback for this service, a reduced ductility at around 1400 to 1700 deg. F. As a result, if the still is fired carelessly or is allowed to overheat, the 18-8 may rupture without warning and there have unfortunately been a few very serious occurrences of this nature. However, care in supervision of the stills avoids this hazard altogether, and there are many thousands of 18-8 still tubes in oil-cracking service today, without a single serious accident of record in two or three years.

In this connection we shall mention later on the treatment of 18-8 with titanium, which is a preventive of intercrystalline corrosion. It should be stated that some refiners are using for this service a lower-chromium straight-chromium steel (four to six per cent Cr) with or without molybdenum which has shown creditable performance at temperatures up to 1100 deg. F.

Behavior in Architectural Service

Now a word as to details of behavior in architectural service: The first widely publicized use of stainless steel for weather resistance was on the Chrysler Building, New York, followed shortly by the Empire State Building. Since these are in a sense test cases, and have been in the weather now for several years, we believe it to be of interest to report the results of a close examination made on the buildings a few months ago.

The Chrysler Building employed, as just mentioned, the first large quantities of stainless steel for exterior surfaces. The behavior of the steel on the upper floors, where it has been exposed to the weather for three years, is our main point of interest. A slight dulling which has removed the brilliant glare which was present when the building was erected is observable. Perhaps the severest buffeting by the weather is visited on the gargoyles, which project from the sixty-first floor. Streaks due to rain and dust are noticeable, but the metallic luster is well preserved. Welded places have held well, and there are no signs of destructive corrosion.

The Empire State Building was likewise examined in September. Some discoloration by dust and rain streaks is only a surface deposit which can be rubbed off, as by a handkerchief. The steel itself retains its

(*Concluded on Page 58*)

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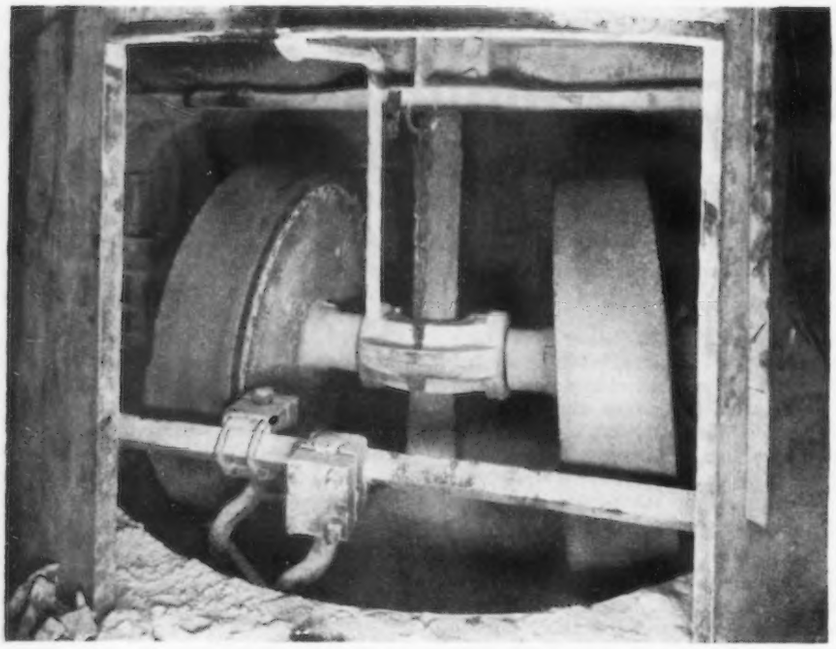
DR. GROSSMANN, in a meeting at New York on stainless steels, described the development of the chromium and the chromium-nickel ferrous alloys. Beginning with the application to cutlery, he touched at some length on the uses of stainless steel in nitric acid industry and recounted the solving of welding, riveting and pickling problems. He also mentioned conditions of its adoption by automobile, paper, pump, chemical and dental goods manufacturers and referred to the duplex plate now available, composed of a base of ordinary steel surfaced with a layer of the stainless product.

The accompanying is his account of experiences with stainless steel tubing, a report on the behavior of the material in building exterior adornment and a statement of the part that other alloying elements may play.

Abrasion-R



FOR exceptional wear requirements, the advantages of chrome-molybdenum are well illustrated in this 7-ft. dry pan. The tire at the left is ordinary cast iron and at the right, Bethlehem chrome-molybdenum.

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IN the ceramic industries a great portion of the machinery consists of castings subjected to severe abrasion and in some cases to moderately high impact stresses. The relatively short life of most of these castings stimulated a careful study of abrasion-resisting metals, with the result that the Bethlehem Steel Co. recently developed a special chrome-molybdenum alloy steel having unusually high resistance to abrasion.

In the research work preceding this development the general characteristics of the raw materials to be processed were studied with reference to the wear on specific parts of the machinery. These raw materials include clays, shale, silica glass sand, ganister rock, feldspar, sillimanite, carborundum, mullite, and a product known as aluminum oxide. Hard shale and fire clay impose particularly severe strains upon the parts of the machinery that come in contact with these materials. A few specific parts are muller tires, bottom plates, pug mill knives, crusher rolls, screen plates, roll shells and sprockets.

The causes of uneven wear were studied, with particular reference to analysis, hardness, microstructure and design. Chilled iron tires are in general use in the ceramic industry. When the chill is worn through, there is nothing left but gray iron to resist wear. The two outside corners are always harder than the center of the face of the tire, causing the tire to wear concave on the face and often causing the high corners to break off.

When alloy iron tires are used, pockets often develop which cannot be overcome by readjustment of the plows. The wear will be more rapid on the softer spots, which accounts for the pockets. Most iron castings of this character are not susceptible to an effective hardening treatment and, accordingly, the material is often used in the as cast condition.

Austenitic manganese steels have been tried for this service but have not proved entirely successful in all applications. While the Bethlehem Steel Co. produces a large tonnage of this material, it is not advocated for such use, in that it does not show an advantage from a service standpoint commensurate with its cost. Some manganese steels are probably the toughest of all steels, but it requires impact to impart hardness before its value as an abrasive resistant becomes effective. Under repeated impact the hardness will mount from 200 Brinell as cast to over 500 Brinell hardness. However, in most clay machinery, there is not sufficient impact to effect this required hardening, and thus this steel is found unsuited for some applications.

A Heat-Treatable Casting

After a detailed study of these various factors, the Bethlehem Steel Co. felt that a new alloy steel should be developed which would meet more closely the demands imposed by many applications. The answer was found in a chrome-molybdenum alloy steel casting capable of heat treatment to obtain the desired abrasive and impact resistance.

Chromium dissolves in liquid iron and, according to Sauveur, is retained in solid solution, both in gamma and alpha iron. In the presence of carbon, a chromium carbide is formed and when other alloying elements are present, double and complex carbides develop. Chromium imparts to steel hardness and wear-resisting properties and permits deeper penetration of hardness.

Molybdenum, again according to Savuer, is soluble in both gamma and alpha iron. It is generally accepted that it also forms complex carbides and induces in the steel a marked ability to retain these carbides in solid solution upon cooling from above the critical temperature. In this propensity toward hardening, molybdenum is (with the exception of carbon) the most active and potent element used in steel, imparting strength, resistance to wear, and toughness. Molybdenum tends to inhibit grain growth when steel is heated to high temperatures and its presence renders steel practically immune to temper brittleness. When properly alloyed, molybdenum does not segregate, but is uniformly disseminated. It is most effective when used in connection with another alloy such as chromium.

The problem was to determine the proper proportions of these elements, together with carbon, manganese and silicon, to produce an alloy steel casting which, after heat treatment, would result in a product with the desired characteristics. The new alloy castings are made from specially melted steel in furnaces operated under close metallurgical and chemical control. The manufacturing process at all times is under the supervision of an observer, independent of the production department, who keeps a permanent record of all details from charge to pour. This includes record of materials charged, chemical tests, additions, temperature readings and other pertinent points of manufacture. The steel is poured into prepared and dried molds, suitably gated and provided with ample heads, to insure sound castings. The castings are shaken out of molds and then cleaned in preparation for heat treatment which varies with shapes and sizes and in accordance with the service intended. It has been found that a knowledge of definite service conditions is of greatest importance so that

Resistant Castings ▲ ▲ ▲

By WILLIAM C. HARTMANN
Steel Foundry Metallurgist,
Bethlehem Steel Co.

heat treatment can be varied to conform.

220,000 Lb. Tensile Strength

Physical properties will vary from an average of 110,000 lb. per sq. in. tensile strength, 60,000 lb. yield point, 20 per cent elongation, and 30 per cent reduction on a fully annealed piece, to 220,000 lb. tensile strength on a piece hardened to 400 to 500 Brinell. Brinell hardnesses as high as 600 can be obtained, although for most conditions it has been found that a less hardness is more desirable.

After heat treatment the castings are not only tested for hardness but for structure as well. It is felt that the measure of abrasion resistance is not alone hardness but hardness coupled with proper grain structure. Complete metallurgical control over all of the above is exercised by the steel foundry metallurgist.

This chromium-molybdenum alloy steel has been tested in grinding a varied assortment of materials—clays, shale, coal, sillimanite, flint and ganister. In tests made in direct comparison with other castings, the alloy steel has been found equal to, or superior, as based on reports received from users.

Performance Records

At the plant of a leading shale brick manufacturer operating five American and one Clearfield grinders, as well as six Hatfield-Penfield dry pans, this grade of steel castings outwore the manganese tires two to two and one-half times, thus effecting a saving from a service and installation cost standpoint.

At another plant a set of these cast alloy steel tires was installed on Aug. 16, 1932, and on Sept. 26, 1932, after grinding 290 tons of hard shale, equal to 1,124,335 bricks, the tires showed not enough wear to measure.

Another comparison in actual service involves abrasive refractory brickmud. The alloy cast steel tires were 66 2/3 per cent worn out after 1,063,300 bricks, whereas two other tires (not alloy) were 80 per cent worn out after 789,500 and 802,930 bricks respectively.

About a year ago there was installed on a 7-ft. dry pan used for grinding PB sillimanite two new muller tires. One tire was an ordinary cast iron tire as supplied by the manufacturer of the dry pan and the other tire was a Bethelem cast chrome-molybdenum alloy steel tire. PB sillimanite is an extremely abrasive material and causes rapid wear on all dry pan parts. At the end of two or three months the ordinary tire was grooved in the center to a depth of about ¾ in. and showed some chipping on the edges, whereas the alloy steel tire showed no appreciable wear at any point and the edges remained sharp and unchipped.

After about six months' use, the ordinary tire was worn and chipped so badly that it had to be removed, while the alloy steel tire showed wear on the center of the grinding face to a depth of only ¼ in. to ½ in., with the edges still free from chipping. This is illustrated in the accompanying photograph taken just before the removal of the cast iron tire (on the left) which was replaced by a second cast alloy steel tire. After this tire test had been under way for about three months, it was decided to install solid wearing plates made of the same alloy steel castings. After six months' use these plates showed no appreciable wear.

Creep of Nickel-Chrome-Iron Alloys Measured

Research Paper No. 572, which will be published in the June number of the Bureau of Standards *Journal of Research*, gives the results of "creep" measurements on a series of nickel-chromium-iron alloys at 870 deg. C. (1600 deg. F.).

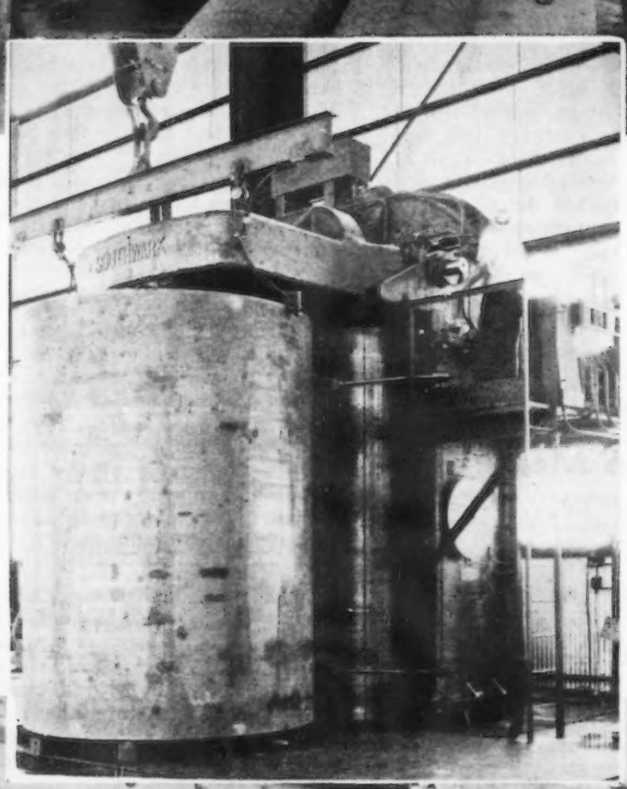
A study was made of the creep resistance of 15 alloys covering a range from 1 to 75 per cent nickel and from 3 to 55 per cent chromium. The results were compared with those of a previous investigation at 538 deg. C. (1000 deg. F.) on similar alloys.

In the investigation at 538 deg. C. (1000 deg. F.) of the nickel-chromium-iron system, it was found that the alloys containing little or no iron, 50 to 80 per cent nickel and 20 to 50 per cent chromium exhibited the greatest resistance to creep. At 870 deg. C. (1600 deg. F.), the strongest alloys are those containing approximately equal parts of nickel, chromium and iron.

An attempt was made in a metallographic study to distinguish between the effect on structure of elevated temperature alone and of elevated temperature and stress combined. A comparison was made between the structure in specimens used in the creep test and that in the unstressed specimens of the same alloys annealed at 870 deg. C. (1600 deg. F.) for periods ranging from 100 to 1000 hr. or quenched in iced brine from that temperature. In nearly all cases the quenched specimens were similar in structure to the annealed materials which indicates that these alloys were not readily heat-treated.

Carbide precipitation and agglomeration of the carbide at the grain boundaries were most pronounced in both the binary iron-chromium alloys and the ternary iron-chromium-nickel alloys of higher chromium content. Prolonged heating, of both stressed and unstressed specimens, did not produce any pronounced changes in the structure of the binary iron-chromium alloys or the ternary alloys except those containing 50 per cent or more of nickel.

Improvements in the vacuum fusion method for determination of gases in metals will be described by Lewis Reeve at the Detroit meeting of the American Institute of Mining and Metallurgical Engineers, scheduled for October. Pamphlet copies of the paper by Mr. Reeve, who is identified with the metallurgical department of the A. O. Smith Corpn., Milwaukee, have now been distributed to the members interested. The analysis of a steel sample for the gas content may be obtained under the Reeve system in less than 3 hr.

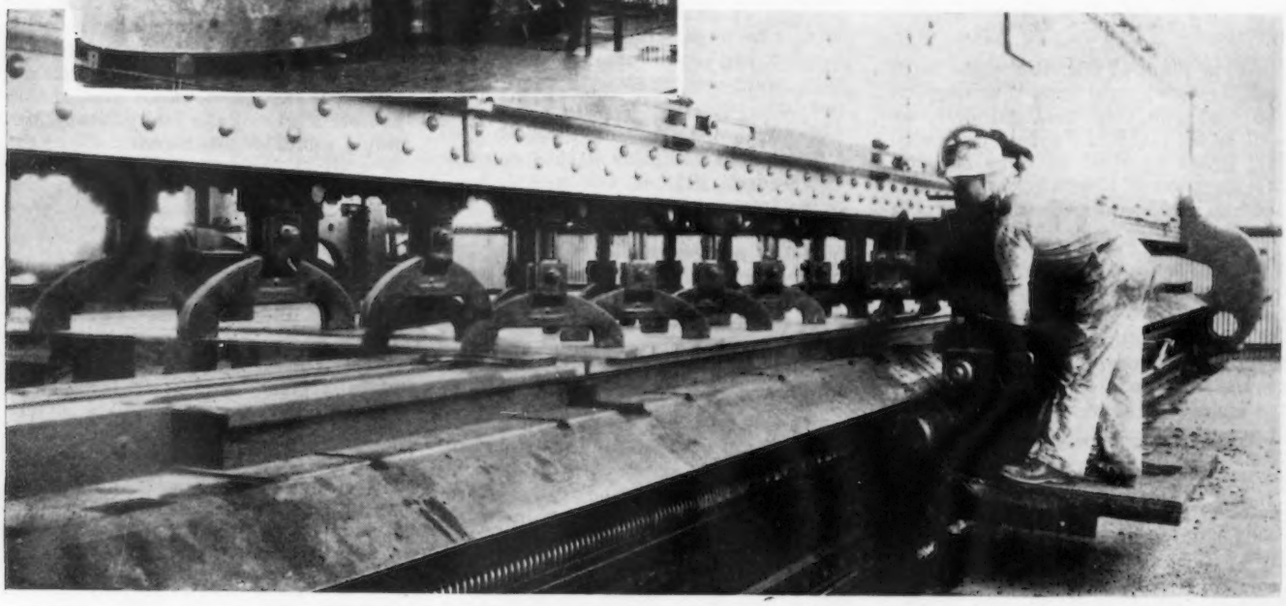


Fabricating Pipe at Boulder Dam

INTERIOR of the field fabricating plant of the Babcock & Wilcox Co. at Boulder Dam. This plant is 520 ft. long and 90 ft. wide, and is equipped to fabricate by fusion welding and to test by X-ray 14,500 ft. of pipe 8½ to 30 ft. in diameter, made from ⅛ to 2¾-in. thick steel plate. Fabrication of the pipe at the site of the dam is necessary because the finished pipe sections are too large for railroad transportation. Automatic welding machines employed are shown at left in view above. There will be about 400,000 linear ft. of welding in making these pipes.

Below is pictured the plate planer installed for planing and beveling the edges of the plates preparatory to welding. The bed is 40-ft. long.

The plate is rolled into pipe sections on the powerful vertical roll shown at left. The rolls of this machine are 3 ft. in diameter and 12 ft. high.



Builds Floor-Type Horizontal Boring Machine With Two Spindles

A NEW horizontal boring machine having two spindles, one main and one high-speed auxiliary, has been added to the line of high-power precision boring, drilling and milling machines built by the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

As shown in the illustration, the column that carries the spindle head is of massive proportions. The main spindle is 3½ in. in diameter and runs at speeds up to 500 r.p.m. The auxiliary spindle is arranged to operate at speeds up to 1500 r.p.m., which permits drilling or boring even the smallest holes or using the smallest end mills with high efficiency. The lower-speed main spindle, used for the larger boring, milling and drilling operations, is carried by entirely independent bearings so that the original precision alinement will not be impaired.

Each spindle has 36 speeds and 18 feeds, arranged in geometrical progression. Speed changes are accomplished by means of sliding gears and jaw clutches through three levers located at the front of the head. A selecting lever permits engagement of one or the other spindle; the same lever also controls the application of the feed to either spindle.

The 18 feeds are controlled through two levers, with a third for direction. Slow hand feed is applicable to either spindle through a handwheel at the front of the head. A trip is provided for automatically throwing out the feed at any predetermined depth within 6 in. spindle travel. Pick-off gears are incorporated in the feed train so that practically any range of feeds or any particular feed may be obtained.

A separate milling feed unit giving 18 changes with directional control is built into the spindle head, permitting the head to feed up or down on the column, or the column to feed back and forth on the runway, either at feed or rapid traverse. The speeds and feeds applying at any time to the spindle or milling units are shown on direct-reading dials. Hand feed adjustment is also provided. Suitable provision is made for powerfully clamping the spindle head to the column and the column to the runway.

Anti-friction bearings are employed throughout, and all parts of the machine are lubricated automatically. The motor is mounted on an adjustable bracket at the bottom of the column.

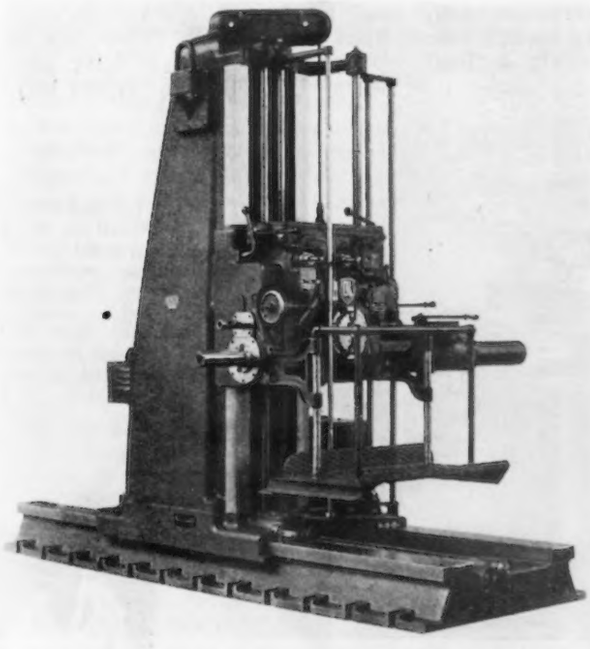
This machine, the No. 35-F, can be furnished with a maximum of 96 in. vertical travel of the spindle head on the column, and a horizontal travel of the column on the runway to meet requirements. Safety trips are provided at the end of each travel.

Standing on the telescoping platform, the operator controls conveniently the entire machine. The directional control, which removes all doubt as to engagement of the proper unit in the right direction, the rotary controls for speeds and feeds, as indicated on direct-reading dials, and the safety devices provided for every unit, are emphasized as reducing mental and physical fatigue of the operator to a minimum.

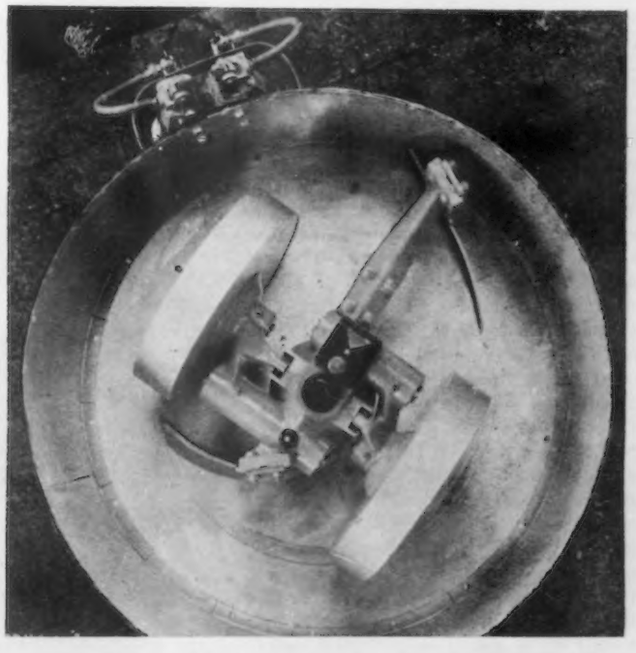
Improved Sand Mixer

ANTI-FRICTION bearings on the vertical shaft and mullers and a simplified lubricating system, wherein the vertical shaft operates in a bath of heavy lubricating oil, are features of an improved 6-ft. diameter pan Simpson intensive sand mixer being announced by the National Engineering Co., Chicago. There are only six points of lubrication. The mullers are offset on each side of the center-line of the machine to increase the mulling and rubbing action. Further, the mullers are adjustable to eliminate grinding of the materials.

Adjustment of the plows has been simplified and a crib fillet improves the efficiency of the blow action. Turrets are now made 2¼-in. higher and the bevel and pinion gears are steel cut, the bevel gear being made with demountable tooth rim. It is claimed that these changes result in lower maintenance cost. All the improved features of this new model H, No. 2, mixer may be installed economically on any No. 2 Simpson mixer now in operation.



THE 3½-in. main spindle operates at speeds up to 500 r.p.m. while the auxiliary spindle runs at speeds up to 1500 r.p.m., permitting drilling or boring of smallest holes and efficient use of smallest end mills.



ANTI-FRICTION bearings are used on the vertical shaft and mullers of this new Simpson sand mixer. All improved units may be installed on No. 2 machines now in use.

Heavy-Duty Drilling Machines Have Speeds as High as 1700 R.P.M.

CLEEREMAN MACHINE TOOL CO., Green Bay, Wis., has announced through its national distributer, Bryant Machinery & Engineering Co., 400 West Madison Street, Chicago, a new line of heavy-duty drilling machines featuring unusually high cutting speeds. A 30 per cent increase in the number of spindle speeds and speeds as high as 1700 r.p.m. are available in the six different sizes. These machines are completely geared, with positive feeds.

Spindle and sleeve are made from heat-treated chrome manganese forgings. The spindle is journaled in the lower part of the sleeve in a heavy-duty roller bearing and the upper part in a phosphor-bronze bushing. It is provided with thrust bearings at both upper and lower ends. The driving end is multiple splined with six integral keys. It is driven from the helical tooth back gear by a long sleeve which revolves in precision anti-friction bearings. The nose contains a standard Morse Taper. It can be provided with a hardened nose and arranged with special driving slots or threaded sections, to suit conditions. A spindle revolution counter can be incorporated on the head to show the exact revolutions per minute of the spindle. The sleeve has an exceptionally long bearing in the head, the lower bearing section being capped. The ½-in. circular pitch rack teeth are cut from the solid.

The driving mechanism consists of 13 gears from which 12 spindle speeds are secured. All gears and shafts are of chrome-nickel steel, heat treated. Shafts are extra large with six splines cut and operate on heavy-duty anti-friction bearings.

There are nine changes of feed in geometrical progression. Quick changes are made through sliding gears and one positive-tooth clutch. The initial drive is taken from the spindle. Feeds are transmitted to the spindle sleeve pinion through a worm and Ampco bronze worm wheel, eliminating backlash. The clutch, of positive fine-tooth type, is actuated by a four-spoke turnstile, which is also used for a quick traverse. A small handwheel on the worm shaft provides a hand feed. The depth gage can be used for the full travel of the spindle by pulling out a spring plunger just before the tripping point makes contact. Tap leads consisting of 12, 18, 24 and 36 threads per inch are built into the feed mechanism. Pick-off gears can be supplied for any thread. The entire mechanism is protected by a sensitive overload safety device.

A friction clutch consisting of multiple disks is built into the machine. It is mounted on anti-friction bearings, and is easily adjusted. The addition of two gears and one clutch converts this unit into a quick reverse tapping attachment. Automatic reverse having a depth stop can be furnished. Convenient control is a feature, and lubrication of the machine is automatic, provision being made for a continuous supply of filtered oil.

Either belt or constant-speed motor drive can be furnished. Gear connected or built-in backgear motors are mounted on the side of the machine and connected to the primary shaft through a flexible coupling. Standard motors are mounted on the rear of the machine, and connected by silent chain or V belt to the primary drive shaft.

The head is a unit within itself and can be arranged in gang style of from two to six spindles. It can also be built into special machines for multiple-spindle, single-purpose operation. Various types of tables can be furnished, and special feeds and speeds and special adaptations of this machine, or its head, can be made to suit any condition.

New Single and Double-End Precision Boring Machines

NEW single and double-end boring machines for short-production high-precision work on connecting rods, pistons, gears, pump cylinders, refrigerator compressor bodies, and similar parts have been brought out by the Ex-Cell-O Aircraft & Tool Corpn., Detroit.

The double-end machine, designated as the Junior Style No. 1212, is of compact design and has full hydraulic control. A bridge is provided at each end upon which one or two boring units are mounted. There are two boring units with a drive motor mounted above them and one boring

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A DOUBLE-END as well as single-end model of this boring machine is made. They are designed for short production, high precision work on pistons, gears and similar parts.

unit with motor mounted beside it. The type and number of boring units used depend upon each individual application. Each bridge is adjustable on its own rails, giving a maximum and minimum distance of 28 in. and 21 in., respectively, between boring units.

There are two different methods for driving the boring units, the inbuilt motor and the belt-driven type. With the inbuilt type a ¾-hp., 1800 or 3600-r.p.m. motor is used, and only one speed is obtainable. On jobs requiring a range of speeds the belt-driven boring unit is used. A 1 hp., 1200-r.p.m. motor may be mounted beside the boring unit or directly above it, depending upon the number of boring units required.

The fixture table is provided with a vee and a flat way, each being lubricated from the hydraulic pressure system. The hydraulic control unit, of Ex-Cell-O design, is mounted on the front of the machine below the fixture table. Near the top of this unit is an oval plate which can be removed for adjusting the rate of table feed in each direction. Plungers extending through and above the top of the unit are operated by adjustable dogs located on the side of the fixture table. By adjusting these dogs any desired operating cycle can be obtained. A complete coolant system, including adjustable table dogs that operate a control valve, enabling the operator to load in a dry fixture, is provided. The machine occupies a floor space of 14½ sq. ft.; it weighs approximately 3000 lb. complete.

Single-End Boring Machine

The single-end precision boring machine, designated as the style No. 2112, has the same mounting bridge, hydraulic and coolant systems as the double-end unit. Additional room is provided on the side and end of the machine so that the operator can operate the machine in either position. Another type of boring unit is used on this machine. This type has an inbuilt motor directly connected to the boring spindle and mounted in one holding bracket. These units and those on the double-end machine are interchangeable by the use of the proper bridge.

To operate the single-end unit, the adjustable dogs which actuate the plungers on top of the hydraulic mechanism are adjusted so that the high and low speeds, reverse and stop dogs conform to the required operating cycle. The machine is started on its cycle by moving the handlever located in the center of the unit to the right, and the table is stopped automatically when through its cycle. Moving the handlever to the left provides a manually-controlled stop. The table may be reversed at any time during the cycle by means of the knob at the right of the handlever.

Combination Drilling and Forming Machine

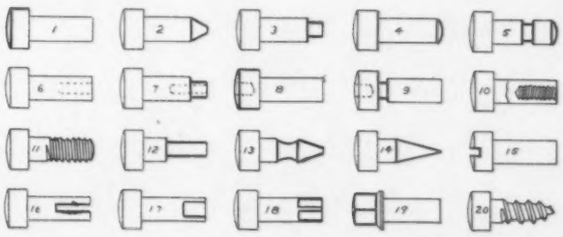
AN improved combination drilling and forming machine has been brought out by the H. P. Townsend Mfg. Co., Hartford, Conn., the unit being one of a group of the company's automatic screw machines using hopper or magazine feeds.

One of several types of feed can be furnished for feeding headed screw blanks, special rivets and studs, also straight blanks without heads, small tubes or shells with or without closed ends. The work spindle is of two-jaw type, the jaws being opened and closed by toggle links operated by springs of different tension, according to requirements. It is made of steel throughout and fitted with oversize ball bearings. A finger device feeds the blanks into the spindle either head or point first so that pointing, shaving, drilling or hollow milling operations can be performed on either end. By means of a suitably formed tool mounted in the tool-holder on the tool-shaft, the tool is rocked on the shaft for feeding and can be rocked straight into a forming cut or slightly sideways for shaving and pointing operations.

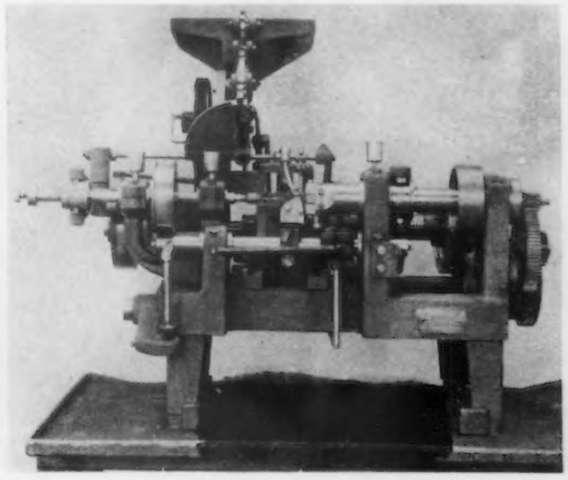
The drill spindle is equipped with "Trump" chucks which will carry drills from the smallest up to the ¼-inch. size. High drilling efficiency without high spindle speeds is attributed to the fact that the drill spindle runs in the opposite direction from the work spindle. Hollow mills, as well as drills, may be used for reducing diameters too long for a forming operation. The cams which operate both forming tool and drill spindle are simple; they are mounted on the left end of the camshaft and may be changed conveniently. All adjustments are easily accessible from the front of the machine.

The machines are furnished with tables which can be set up singly or bolted together so that a battery can be driven from an overhead lineshaft. Space is available underneath the machines for storage. The machines are built in three sizes for work from the smallest up to 5 in. long by ⅝ in. in diameter. They are intended primarily for rapid cuts, and will machine from 6 to 90 pieces a minute, according to the amount of metal to be removed and the work to be done. A variety of operations can be performed on the same blank, as shown in the line sketch.

An economic conference of engineers is to be held again this summer at the engineering camp of Stevens Institute of Technology, near Johnsonburg, N. J., for "engineers and industrial executives who wish to intensify their knowledge of economic subjects." The committee on economics of the American Society of Mechanical Engineers is cooperating. The dates this year are Aug. 12 to 20, with arrangements for limiting one's stay to week-ends if necessary.



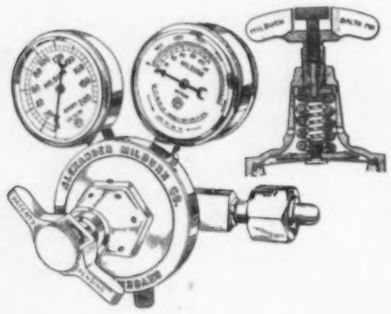
THE variety of operations that can be performed on the same blank is shown in this illustration.



TOWNSEND combination drilling and forming machine with gear guard removed to show the gear train.

Pressure Regulator Has Micrometer Adjustment

THE Alexander Milburn Co., Baltimore, has developed a regulator for use with oxygen, acetylene and other gases, which has a dual adjustment comprising a fine micrometer



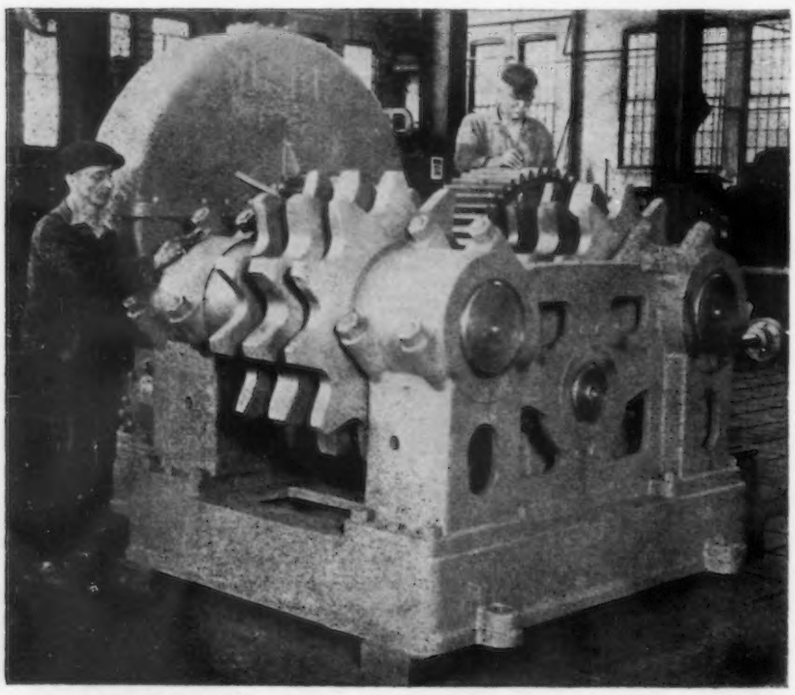
adjusting key housed within but operating separately from the main regulator key. The regulator has two compression springs, one within the other, operating a removable, noncorrosive metal diaphragm. The main key operates the standard or heavy spring, and the micrometer adjustment key operates a fine bronze spring, which enables the operator to secure a range from zero to approximately 5 lb. in addition to the adjustment obtained with the standard key. Fractions of an ounce can be obtained with the micrometer key, either when the pressure is at zero or at whatever pressure the standard key has been set for on the regulator.

The device is sensitive and is adapted for the finer pressures necessary for low-pressure torches and small torches doing fine work and requiring close adjustment. Suitability for torches working on aluminum, airplane parts, fine experimental work, lead burning, laboratory and hospital work, is emphasized.

Design of the micrometer key is simple and is standardized so that the device may be applied quickly to Milburn regulators previously marketed. The only additions are a new key, button and a bronze tension spring.

Large Hoists Built for Boulder Dam

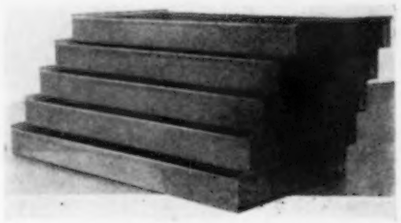
TO lift the gates to each of the 50-ft. diameter spillway tunnels of the Hoover dam, of the Boulder Canyon project, the Scott Foundry Department of the Reading Iron Co., Reading, Pa., has built hoisting mechanisms which include heavy chains passing over the geared sprockets. Each gate leaf weighs 225,000 lb. and the weight of the chain alone when th gate is down is 37,000 lb. The friction losses in pins and sprocket bearings is put at 44,000 lb., so that the total lifting effort required is 306,000 lb. and the capacity of each hoist, including 215,000 lb. in counterweight, is 432,000 lb. The two sets of hoisting apparatus, which were built for the United States Bureau of Reclamation, weigh 140 tons.



Gates of the 50-ft. diameter spillway tunnels of the Hoover dam will be lifted by this hoist, two of which are finished.

Stacking Trays for Shop Use

A NEW stacking tray of less expensive type than its previous design has been placed on the market by the Stackbin Corpn., Providence, R. I., for storage of parts or finished products. Each tray is made so that one fits into another of the same size and can be stacked to any convenient height, in somewhat the same way as the parts of a sectional bookcase. The ends of the tray are formed to provide a guide or channel by means of which the upper tray can slide backward or forward on the lower



one. These channels are formed in a manner that provides a handle for grasping the tray. Made of sheet metal with all edges substantially reinforced by folding over, these trays are said to be practically indestructible. A number of sizes are made. Patents have been applied for.

Six-Inch Die Head for Old Pipe Machines

FOR the rehabilitation of old pipe threading equipment, Oster-Williams have brought out a new die head, designated as the No. 706. The range covers all sizes of pipe from 1 to 6 in. and bolts from ¾ to 6 in., inclusive. The head is calibrated for Briggs standard, but can be marked special to suit requirements. A micrometer adjustment for over or undersize threads is standard equipment.

The threading dies, five to a set, are made of high-speed steel and are of small segmental type, mounted in holders. Single segments are replaceable. For pipe work one set of dies threads all sizes from 1 to 2 in., and one set from 2½ to 6 in. The steel die holders are hardened and ground. Provision is made for supplying cutting oil to the dies.

The head is equipped with a single high-speed cutting-off blade. Reaming and chamfering of pipe are accomplished in one operation by means of a forming tool mounted on the cut-off slide. The head can be adapted to cut taper threads up to 4 in. long.

Ornamental Iron Gains Favor in California

ORNAMENTAL iron work is finding increasing favor in California as a result of the recent earthquake. Architects, builders and public bodies are deciding against stone and brick "gingerbread," which is said to have been responsible for a considerable number of injuries and deaths in the Long Beach 'quake zone. At the same time the Spanish-Californian style of architecture lends itself admirably to the effective use of ornamental iron. Banisters of ornamental iron, such as those shown in the illustration, are widely used in California. The ornamental gates illustrated are said to be the largest and heaviest ever built, weighing more than 28 tons, and were recently built and installed at Forest Lawn Memorial Park, Los Angeles, by Julius Dietzmann, of that city. The Dietzmanns were formerly located at Cologne, Germany, and produced ornamental iron work for the ruling houses of the various German States.

National Industrial Planning Is N

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EFFORTS to interfere with the industrial and trade mechanism of the nation by detailed administration of prices, costs, production and investment can only delay, confuse and obstruct recovery, declares the author. Such interference cannot prevent recovery, in his opinion, but after recovery comes it may still be necessary to recover from the cure.

Interpretations of the depression which led to the Washington experiment have no support whatever in available statistics regarding the course of production, prices, real wages, industrial productivity and consumption in the past century, says Mr. Jordan.

By default, American industry is about to be governed from the outside by doctrines, dogmas and ideologies which have no scientific basis.

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IF, as THE IRON AGE said last week, American industry wants to know what it faces, it should find out for itself and not wait to be told by the extremely confused crowd of Government employees who happen to have accumulated in Washington in the course of the past few weeks and who haven't any very clear or consistent idea of what they are trying to do or what they face in trying to do it.

American industry is much older than this particular group of public officials or the present Administration, and it will probably last longer. It is much older than any university or any school of academic thought and is in much closer contact with the realities of the situation. It should look at this situation in a very realistic way, on the basis of its own actual experience, unflustered by phrases or formulae fed out to the public by newspapers which are as confused about their meaning as are the officials who furnish them.

Its first job is to find the facts about its situation for itself, to assemble and interpret these facts for itself in an organized and systematic way, and to organize itself to act upon these facts intelligently, effectively, and continuously. At the same time it should play the game and cooperate energetically with the public employees who happen to be in office so that it can learn at first hand, in the great laboratory experiment that is being carried on in Washington, just how Government employees act and just what the weaknesses of Government control of business are. In order to be able successfully to shake off this incubus of control at the end of the next two years it must in the meantime prepare itself to take over the job of planning and control which public employees are now attempting. It must develop promptly a central organization of its own to serve as a systematic means of assembling the necessary facts on which planning must be based and as a general staff through which those facts can be successfully and systematically applied to the problem of planning and control.

If it does not do these things there is no doubt that it faces the great danger of permanent paralysis of initiative and enterprise, stagnation and decay, under the hand of political bureaucracy.

Dr. Alfred E. Smith's Diagnosis

In trying to look at the situation realistically the first task of industry is to understand and estimate at their true value the tangle of special academic theories which dominate the policies of the Administration, and the political setting in which those theories are being applied by Government employees in attempting Government planning and control of industry. These theories are those of a special sect or school of academic economic thought, the representatives of which the President happened to be brought into contact with during his pre-election campaign preparations. They have been evolved, in the admirable description of Dr. Alfred Smith, by young men "who have been reading in the library and lecturing to students" and who have never had the slightest experience in struggling with practical problems of prices and costs which are at the root of the business situation in this and every other country at all times. These men, however, have a very keen instinct about how the man on the street feels, because they feel the same way, and this instinct gives their ideology a particularly potent appeal both to themselves and to the public.

Moreover, the public appeal of this ideology is being supplemented, reinforced, and cemented by much older and less academic motives which are at work in the situation. In the first place young students and professors have a very human appetite for exercise of power over others because they never get a chance to enjoy it in the academic halls except by biting each other's backs. The unprecedented power which has been suddenly and unexpectedly put in their hands by a political windfall is something from which they will not allow themselves to be shaken loose if they can possibly help it once they get their teeth into it. On the contrary, as with all public officials, the appetite for power is sharpened by the taste, and tends to feed upon itself till it devours the sense of public responsibility and destroys the sense of perspective.

Second, and more powerful still in supporting the experimental application of these appealing theories to the guinea pigs of business, is the erection of the strongest political machine ever built in this country. This makes the theories of much less pragmatic importance than appears on the surface, for such an efficient political machine can easily and will eagerly service any theory, whether it be State socialism, State capitalism, fascism, or plain old-style capitalism.

Encouragement from "Tired" Business Men

Another motive that must be taken into consideration in a realistic appraisal of the situation is the state of mind of many important industrial executives themselves. After four years of declining business we have entered the age of the "tired conservative." The strain of the depression has set up a slightly socialistic fever among many industrial executives who have become tired of the struggle which the competitive principle of progress imposes upon the management of every enterprise—especially the large-scale established enterprises built up by a pioneering effort of strong personalities in the past, but now increasingly subject to the competitive impact of shifting consumer

Is Not Feasible ▲ ▲ ▲

Governmental Interference With Business Organism Will Obstruct Recovery

By VIRGIL JORDAN
President, National Industrial Conference Board

VIRGIL JORDAN

tastes, changing technological and economic conditions, and the advantages which small-scale concerns have evidenced as the spreading use of electric power has stimulated the decentralization and diffusion of industrial operation. Like aging hippopotami comfortably settled in a shady pool, they have seen the water subside as the economic stream has changed its course, and they welcome the bureaucratic tick-birds who promise to protect them from the competitive stings of the insects in our economic jungle. So they easily think of themselves as semi-public institutions deserving of permanent peace and protection against the shifting stream, and look longingly to the planners and controllers who promise us protection. Paradoxically enough, but sufficiently apparent in this and every other industrial country, the vulnerability of vested interests of vast industries has become a powerful force making for State socialism, State capitalism, and similar forms of public protection for business.

So much for the psychological and political background of the present situation. It is not a complete description, but it may be sufficiently accurately summed up by saying that since last fall we have had in the United States the inevitable revolution which always accompanies in every country a drastic general decline in the price level in face of any considerable structure of fixed debts and capital charges. Practically every group in the United States participated in this revolution, for every group, including the farmers, home owners, industrial workers and business corporations, banks, bank depositors, insurance companies, railroads, was caught between the scissors of prices and costs when so great a change in the price level occurred. The revolution swept into power a new Administration and presented it with the single inescapable problem of readjusting the relationship between prices and costs so as to make possible the resumption of enterprise and the restoration of employment.

The depression came when prices of goods and services produced by industry fell below the cost of their production. Recovery can and will come only when and as prices rise above costs. In no economic system based on buying and selling for money in the hope of a profit has there ever been any other accurate and complete description of depression and recovery. It applies to every depression and recovery experienced in this country, and it is essential to keep in mind now because it is the key to realistic understanding both of the business situation and of Government policies in their economic aspects.

But, of course, this is a description of the depression, not an explanation of it or a prescription for recovery. Why did prices fall below costs and how can they be made to rise above them? Here is where both the amateur and the academic argument begin and where the confusion of policy and conflict of theory among the commissars down on the Potomac commences. The factors influencing prices and costs are many and various and differ widely among industries and trades. The real problem with which the revolutionary government which came into power when the coup d'etat on March 4 was confronted was, however, not a problem of detail. It had to deal with prices and costs as a whole, and the conflicting theories on which it has attempted to approach this problem are the key to the confusion of policy that has resulted.

Three Alternatives

There were three conceivable roads to readjustment of the relation between prices and costs which would permit resumption of employment, industrial production and new enterprise in the hope of profit. The first, which was the old-fashioned road of liquidation and deflation to reduce costs to the new price level by the brutal process of bankruptcy and individual loss through writedown or writeoff of fixed debt charges, was largely ruled out by the revolution itself. That is the road to which the Hoover Administration finally resigned itself in its last stages. Some measures like the revised bankruptcy law and the farm and home mortgage refinancing legislation developed by the last Administration in the hope of easing the deflation process and making it more systematic and uniform have been carried over into the new deal. But this crude deflationist point of view toward the problem has been largely abandoned in Washington, except as applied to the Federal budget, where it still has a stronghold in the Treasury Department and gets some slight but uncertain support from the regimenters, planners, and controllers, chiefly because they fear that a general rise in prices resulting from inflation through an unbalanced budget and large public expenditures will rob them of their opportunity to exercise the power to which they have suddenly acceded.

There remain the two roads, first, of direct detailed administration of the readjustment of prices and costs by regimentation of industry and control of production, prices, and wages;

and second, the road of reflation or restoration of the general price level by monetary manipulation. This inescapable and irreconcilable alternative has faced the Administration ever since March 4. There has been constant vacillation between the two roads under the fluctuating influence of one school of theorists or the other among the Administration's advisors, but for the most part the principle of regimentation or "administered deflation" has ruled. When the inflationists forced the Administration's hand early in the special session, it maneuvered the weapons of inflation out of the hands of Congress for the time being in the Thomas amendment to the Agricultural Adjustment Act, and it has not used them. There has been no actual inflationary force applied to the price level as yet. Prices have risen in speculative anticipation of inflation; but rising prices do not necessarily mean inflation, for they can be sustained only by an actual increase in the volume of currency or credit in use in relation to the rise in production and trade. The Administration, or the immediately dominant sect controlling its policies, hopes that this rise will be maintained and moderately increased without use of the inflationary instruments which Congress has put in its hands, and it is attempting instead to support and control the increase by direct detailed determination of prices and wages and by regulation of production, distribution, employment, and investment under the National Industrial Recovery Act, the Agricultural Adjustment Act, and the Securities Control Act.

It is vitally important to industry to understand the full implications of the dominant idea which underlies the approach of the planners and regimenters to this problem of prices and costs. This idea is the essence of what industry faces and it is with this idea that industry must be prepared to deal by assembling the facts that will demonstrate its fundamental falseness and enable industry to successfully substitute for it a body of organized knowledge and a set of sound guiding principles which will permit it to plan for and control itself.

What the "Regimenters" Believe

To sum up its essential elements briefly: The regimenters believe that this has been an industrial depression, due primarily to defects in industrial management and in the interrelation of industries and agriculture inevitably arising from individual initiative and enterprise in pursuit of profit. They reject in toto the idea that the depression was due to a general change in the price level as a result of deficiencies in our monetary, financial and banking system. The fundamental defect in industrial management to which they attribute the depression is a constant tendency to overproduction due to the fact that too large a part of the product of industry flows into the hands of a small group whose consequent incomes are so large that they cannot spend them, but must invest them, and too small a part of the product flows into the hands of the great mass of wage and salary earning consumers who spend all their income and constitute the main source of demand for the output of industry. This faulty distribution of the national income leads chronically to excessive investment in productive facilities and constantly increases the amount of goods and services coming on to the market sold in excess of the purchasing power of the mass of consumers who constitute the main part of the market for them.

Accordingly, the prime purpose of the planners, expressed in the legislation I have mentioned, and in its administration now under way, is to redistribute the national income as between farmers and urban workers and as between wage earners and investors by direct determination of prices, wages, working hours, and production, and by direct control of new investment and special taxation of higher incomes so as to increase the purchasing power in the immediate consumer market, reduce savings and regulate their flow into new productive facilities. These things are to be done, if possible, by enlisting the cooperation of industrial groups in controlling competition, but if such cooperation is not forthcoming the purpose is to be carried out nevertheless by any extension of Governmental administration of industry and trade that may be necessary, even to the extent of Government ownership and operation.

The crux of this conception of the problem of prices and costs is that disparity between them is the result primarily of overproduction and excessive competition under an individualistic system of enterprise, and that a maldistribution of income is the main factor and not the general influence on the price level arising from changes in the value of the medium of exchange or money. The planners and regimenters, however, fear inflation, or a general rise in the price level by monetary manipulation for more than theoretical reasons. They know that a general rise in the price level due to monetary factors would inevitably lead, as it always has in the past periods of business recovery, to a free expansion of enterprise in all directions, with new investment of savings and credit in expanded productive facilities, development of new products and new business ventures on the unhampered initiative of individuals. This would not only wash out all of the plans for regimentation and control, and with it the functions and powers of the planners, but it would, by creating new competition in every field, challenge the capacity of established interests in those fields to catch up with the march of technical progress and changing consumer requirements. A period of inflation and rapid business expansion is always bound to be a menace to tired and backward business managements; it brings too many energetic, ambitious intruders into the field, and upsets too many established situations.

These ideas are not novel or newfangled notions. They are in fact now rather old-fashioned economic theories, well worked out and fully elaborated in academic circles here and abroad. What is more important is that they make a strong appeal not only to the general wage-earning public by promising higher wages and shorter hours, but to a large group and perhaps the majority of American business men themselves at this stage of such a depression as we have experienced. Most business men still believe that the depression and the decline of prices were due to overproduction and to excessive or destructive competition, and lend an eager ear to proposals for Government aid in maintaining prices, limiting production, apportioning markets and allocating quotas. The academic planning enthusiasts, therefore, have their strongest allies among tired business executives who have never taken the trouble to understand the underlying facts.

Interpretation of "Planners" Unsupported by Facts

Aside from the obvious fact that it is intellectually impossible for any group of experts in Government employ, even when they have at beck and call a vast body of tired business men, to administer the price and wage structure of a vast industrial nation or determine the balance of its production and investment, there are two observations on these underlying ideas which must be made with all emphasis. *The first is that there is nothing in the body of available statistical fact regarding the course of production, prices, real wages, industrial productivity and consumption in the past hundred years of our history to lend the slightest scientific support to any of these interpretations of the depression or the problem of recovery and of business stability.* There is no ground whatever for the assumption of any overproduction, any general increase in per capita productivity, any pronounced change in the distribution of the national income as between investors and workers, or any excessive rate of investment in productive facilities. The assertions on this score simply will not stand analysis.

The statistical investigations covering almost the entire record of our industrial development made by the general statistician of the Federal Reserve Bank of New York, Carl Snyder, which are the most comprehensive and careful and original researches into our economic development available, show quite clearly that the great changes in the price level in this country have been solely the result of monetary and financial factors that have led to expansion or contraction of the purchasing medium out of relation to the growth of the

(Concluded on Page 36)

▲▲▲ THE NEWS OF THIS WEEK ▲▲▲

First Public Works Allotment of $115,513,610 Made

WASHINGTON, July 18.—With the hope of giving 1,000,000 men work by Oct. 1, the Federal Public Works began its first allotments last Friday when it distributed $115,513,610. Of this sum $64,561,542 will be expended through 35 governmental agencies. Roads in national parks, national forests, etc., were allotted $50,000,000 and non-federal projects were tentatively allotted $952,068 for distribution to 25 bodies, chiefly waterworks, sewers, and sewerage plants. This distribution is subject to satisfactory working out of contracts.

Federal allotments cover repair work, new construction, highway projects, reclamation work, etc. Among the more important allotments are the following: Bureau of Reclamation, $44,460,000, of which $38,000,000 will go for the Boulder dam project; Alaska Road Commission, $1,000,000 for highway construction and $96,000 for air fields; Indian Affairs, $2,820,000 for schools, hospitals and equipment on reservation; Bureau of Lighthouses, $5,353,551, for repairs, replacements, and improvements of aids to navigation, including lighthouses, light ships, etc.; Bureau of Plant Industry, $648,806 for repairing, renovizing and reconstruction work; Bureau of Animal Industry, $549,240 for preserving, repairing and improving equipment.

Among projects tentatively approved are the following: Sylacauga, Ala., $100,000 waterworks system; Montgomery, Ala., $70,000, waterworks system; Pahokoe, Fla., $100,000, waterworks system; Spanish Fork, Utah, $80,000, waterworks system; East Brunswick Township, N. J., $60,000, water system; Petersburg, Ind., $50,000, waterworks improvement; Tooele City, Utah, $50,000, waterworks.

Contractors' Code Calls For 150-Hour Month

WASHINGTON, D. C., July 18.—An average reduction of 27 per cent in the working hours of construction labor and the establishment of local and regional minimum wages meeting the approval of labor, itself, are provided in the code of fair competition for general contractors submitted to Administrator Hugh S. Johnson by the National Industrial Control Committee for General Contractors.

The code, when approved, will govern the expenditure of the $3,300,000,000 provided in the public works construction program, as well as all private construction during the next two years and will provide employment for additional thousands in the construction field.

The proposed code provides for a 150-hour month, as compared with an estimated present average of 206 hours per month, and for minimum rates of wages established with the approval of the President either regionally or locally by mutual agreement.

As a temporary stop-gap, or until the mutual agreements can be arrived at through collective bargaining and approved by the President, the code provides that the minimum wages established by the various State highway departments in conformity with the National Industrial Recovery Act shall be invoked. These rates have been used as the minimum on all Federal Aid Highway work during the past year and, after an anticipated upward revision, will control the expenditure of an estimated $600,000,000 in road work during the present fiscal year.

The minimum rates, as at present set, average 35 2/3c. per hour in the 36 States that have a statewide minimum for unskilled labor, whereas for the twelve States which vary the minimum within their borders the average variance is from 29 1/3 to 41¼c. per hour.

British Pig Iron Up in June, Ingots Down

LONDON, ENGLAND, July 18 (*By Cable*).—Gains in British ingot production registered during April and May were erased in June, the total production for that month being 568,800 tons as compared with 599,600 for the month previous. Pig iron production for June, however, registered an increase over May; the third consecutive monthly increase since March, 1933. Monthly totals for 1932 and 1933 are shown below:

1932	Pig Iron	Steel Ingots
Jan.	332,400	429,700
Feb.	318,100	480,600
March	335,600	462,800
April	316,900	433,300
May	315,300	416,900
June	311,400	459,300
July	292,600	430,300
Aug.	259,400	361,500
Sept.	260,400	430,300
Oct.	275,600	438,500
Nov.	267,700	473,800
Dec.	284,500	430,400
	3,569,900	5,247,400
1933		
Jan.	286,600	444,400
Feb.	270,800	482,700
March	332,200	577,700
April	324,700	513,300
May	339,900	599,600
June	345,600	568,800

Refractory Complaint Dismissed

WASHINGTON, July 18.—The Federal Trade Commission has dismissed a complaint against the Aetna Fire Brick Co., Oak Hill, Ohio, and others, having to do with the sale of refractories.

Personnel of Commerce Advisory and Planning Council

THE following record gives the titles and tentative personnel of the various committees and subcommittees created as a result of the formation of the Business Advisory and Planning Council for the Department of Commerce on June 26.

As definite acceptances have not been received from all of the members of the committees, it is necessary to consider the list tentative at this time, except the Chairmen, all of whom have accepted.

The broad purpose of the council is to bring business into the closest possible cooperation with Government for the two-fold purpose of first, giving the taxpayers the best departmental service for their money in the form of information of assured public value, and secondly, in providing a sense of direction to business, more particularly in considering long-range problems to be faced if the industry of this country is to be put back on a sound footing.

Officers of the Council

Gerard Swope, Permanent Chairman, Pres., General Electric Company, New York, N. Y.

Col. John H. Fahey, Exec. Vice-Chairman, Publisher, Worcester *Post*, Worcester, Mass.

Gen. R. E. Wood, Vice-Chairman, President Sears, Roebuck & Company, Chicago, Ill.

Henry H. Heimann, Permanent Secretary, Exec. Mgr., National Assn. of Credit Men, 1 Park Avenue, New York, N. Y.

Executive Committee

Gerard Swope, Permanent Chairman, Pres., General Electric Company, New York, N. Y.

Col. John H. Fahey, Exec. Vice-Chairman, Publisher, Worcester *Post*, Worcester, Mass.

Gen. R. E. Wood, Vice-Chairman, Pres., Sears, Roebuck & Company, Chicago, Ill.

Henry H. Heimann, Permanent Secretary, Exec. Mgr., National Assn. of Credit Men, 1 Park Avenue, New York, N. Y.

Henry I. Harriman, Pres., U. S. Chamber of Commerce, Washington, D. C.

Edmond C. Van Diest, Pres., General Service Corporation, Colorado Springs, Colo.

Austin Finch, Pres., Thomasville Chair Company, Thomasville, N. C.

Frederick D. Gardner, Ex-Governor of Missouri, 1821 Chauteau Avenue, St. Louis, Mo.

Committee on Decentralization of Industry

W. A. Julian, Chairman (Treasurer of U. S., Washington, D. C.), Shoe Manufacturing, Cincinnati, Ohio.

H. P. Kendall, Vice-Chairman, Pres., Kendall Company, Boston, Mass.

F. B. Davis, Jr., Pres., United States Rubber Company, New York, N. Y.

Ralph E. Flanders, Pres., Jones & Lamson Machine Company, Springfield, Vt.

de Lancey Kountze, Chairman, Devoe & Reynolds Co., Inc., New York, N. Y.

Morris E. Leeds, Pres., Leeds & Northrup, Philadelphia, Pa.

George H. Mead, Pres., Mead Corporation, Dayton, Ohio.

M. L. Wilson, Bozeman, Mont.

Frank Rand, International Shoe Company, St. Louis, Mo.

Committee on International Trade Relations

Alfred P. Sloan, Jr., Chairman, Pres., General Motors Corporation, New York, N. Y.

Thomas J. Watson, Pres., International Business Machine Corporation, New York, N. Y.

Fred I. Kent, Federal Reserve Bank, 33 Liberty Street, New York, N. Y.

Alexander Legge, Pres., International Harvester Co., Chicago, Ill.

Myron C. Taylor, Chairman, U. S. Steel Corporation, New York, N. Y.

Walter C. Teagle, Pres., Standard Oil Co. of New Jersey, New York, N. Y.

Committee on Business Ethics, Unfair Competition, Standardization and Elimination of Wastes of Distribution

Lew Hahn, Chairman, Pres., National Retail Dry Goods Assn., 225 West 34th Street, New York, N. Y.

A. Lincoln Filene, Chairman of Board, William Filene's Sons Co., Boston, Mass.

Lionel J. Noah, Pres., American Woolen Company, New York, N. Y.

Clay Williams, Pres., Reynolds Tobacco Company, Winston-Salem, N. C.

J. L. Johnson, President, Lambert Pharmacal Company, 200 Park Avenue, New York, N. Y.

Committee on Statistical Reporting and Uniform Accounting

Walter S. Gifford, Chairman, Pres. American Telephone & Telegraph Co., New York, N. Y.

W. A. Harriman, Chairman, Union Pacific Railroad Company, 59 Wall Street, New York, N. Y.

Pierre duPont, Chairman, E. I. duPont de Nemours & Company, Wilmington, Del.

Melvin A. Traylor, Pres., First National Bank of Chicago, Chicago, Ill.

Committee on General Economic Research

Gerard Swope, Permanent Chairman, Pres., General Electric Company, New York, N. Y.

Col. John H. Fahey, Exec. Vice-Chairman, Publisher, Worcester *Post*, Worcester, Mass.

Gen. R. E. Wood, Vice-Chairman, Pres., Sears, Roebuck & Company, Chicago, Ill.

Henry H. Heimann, Permanent Secretary, Exec. Mgr., National Assn. of Credit Men, 1 Park Avenue, New York, N. Y.

Henry I. Harriman, Pres., U. S. Chamber of Commerce, Washington, D. C.

Edmond C. Van Diest, Pres., General Service Corporation, Colorado Springs, Colo.

Austin Finch, Pres., Thomasville Chair Company, Thomasville, N. C.

Frederick D. Gardner, Ex-Governor of Missouri, 1821 Chauteau Avenue, St. Louis, Mo.

Committee on Departmental Problems

John H. Fahey, General Chairman, Publisher, Worcester *Post*, Worcester, Mass.

Subcommittee on the Foreign Service of the Department

Col. Edw. N. Hurley, Chairman, 208 South La Salle Street, Chicago, Ill.

Jas. A. Farrell, 26 Beaver Street, New York, N. Y.

Jas. D. Mooney, Pres., American Manufacturers Export Association, New York, N. Y.

Subcommittee on the Work of the Department in Making Domestic Commerce Surveys

Henry S. Dennison, Chairman, Pres., Dennison Manufacturing Co., Framingham, Mass.

William T. Kemper, Chairman of Board, National Bank of Commerce, Kansas City, Mo.

Fred J. Lingham, Pres., Federal Mill, Inc. (Pres., Millers National Federation), Lockport, N. Y.

R. M. Weyerhaeuser, Weyerhaeuser Forest Products Co., First National Bank Bldg., St. Paul, Minn.

Prof. Joseph H. Willits, Dean, Wharton School of Finance & Commerce, University of Pennsylvania, Philadelphia, Pa.

Subcommittee on Fees for Departmental Services

Robert L. Lund, Chairman, Vice-Pres. and General Manager, Lambert Pharmacal Co., St. Louis, Mo.

Sidney J. Weinberg, Goldman Sachs Company, 30 Pine Street, New York, N. Y.

Thomas H. McInnerny, Pres., National Dairy Products Corporation, New York, N. Y.

James H. Rand, Jr., Pres., Remington Rand, Inc., New York, N. Y.

Subcommittee on the Reporting & Publication Policy of the Department Including Questionnaires

Dr. C. K. Leith, Chairman, Professor of Geology, University of Wisconsin, Madison, Wis.

E. T. Stannard, Pres., Kennecott Copper Co., 120 Broadway, New York, N. Y.

M. L. Benedum, Benedum Trees Building, Pittsburgh, Pa.

JOHN W. O'LEARY
President, M.A.P.I.

Machine Tool Builders Vote To Join Machinery Institute

Will Conform to Institute's General Code on Wages and Hours and Prepare Supplementary Code Covering Trade Practices

E. A. MULLER
President, N.M.T.B.A.

CLEARLY and energetically registering its intention to promptly give its support to the President's recovery plan, the National Machine Tool Builders met in special session at Hotel Cleveland, Cleveland, July 13 and 14. The purpose of the meeting was, of course, consideration of a code for the industry. E. A. Muller, president of the association, and president of King Machine Tool Co., Cincinnati, was the presiding officer.

The attendance of machine tool builders was unusually large and fully representative of the industry. In addition, a number of invited guest executives from related industries were present to exchange viewpoints.

Philip E. Bliss, president of Warner & Swasey Co., Cleveland, who with others has been devoting much time and effort in assisting the organization of the Machinery and Allied Products Institute, was called upon to describe the purposes of that organization, and its relation to the builders of machine tools. This newly formed body, as described in THE IRON AGE of July 6, p. 32—D, is to be a horizontal organization embracing possibly 100 to 140 specialized associations in the machinery building and metal product field. Through this, it is hoped to simplify and standardize the basic elements of code making in the metal-working field, particularly with respect to uniformity of minimum wages and maximum hours, and at the same time to facilitate the task of the Recovery Administration by centralizing its contacts in a broad field of related employment.

With but two dissenting votes, the National Machine Tool Builders' Association, at the general meeting on Thursday, July 13, registered its official decision to become a member of the Machinery and Allied Products Institute.

Membership in this institute does not abrogate the autonomy of the participating association or trade group, which is free to draw up its supplementary code covering trade practices, etc., most suitable for the purposes of its membership. This course will be taken by the machine tool builders, who will adhere, however, like other member groups of the Institute, to its general wage and work-week provisions.

Representatives of the National Machine Tool Builders' Association, in addition to Mr. Bliss, who have been at work as organizers of the Machinery and Allied Products Institute, include Paul DeWolfe, Brown & Sharpe Mfg. Co.; E. A. Muller, King Machine Tool Co., and Fred Geier, Cincinnati Machine Tool Co.

The initial draft of the code of the Institute has been completed and it is expected that it will shortly be in shape for submission to the Administrator.

President E. A. Muller was empowered by the membership of the N. M. T. B. A. to name its representative on the new Institute board. He appointed J. G. Benedict, general manager of the Landis Machine Co., Waynesboro, Pa.

June Commodity Index Up

THE index number of wholesale commodity prices as computed by the Bureau of Labor Statistics of the Department of Labor shows an increase from May to June, 1933, it was announced. This index number which includes 784 commodities or price series weighted according to their importance and based on the average prices for the year 1926 as 100.0 averaged 65.0 for June as compared with 62.7 for May, showing an increase of more than 3½ per cent between the two months, all groups participating in the advance. This is the fourth consecutive month showing an increase, corresponding indexes for February, March and April, 1933, were 59.8, 60.2, and 60.4, respectively. When compared with June, 1932, with an index number of 63.9, an increase of about 1¾ per cent has been recorded in the 12 months. This is the first time since early in 1929 that prices for the current month have shown an increase over the corresponding month of the year before.

Coke, gas and most petroleum products showed advances in average prices causing the group of fuel and lighting materials to increase more than 1¾ per cent from the previous month. Bituminous coal remained at the May level, while anthracite coal and electricity declined slightly.

Metals and metal products as a whole continued upward during June due to advancing prices for iron and steel, non-ferrous metals, and plumbing and heating fixtures. Agricultural implements and motor vehicles showed little or no change between May and June. The index for the group was 2 per cent higher than for the month before. In the group of building materials the average prices of brick and tile, lumber, paint and paint materials and other building materials moved upward during the month, while structural steel and cement showed no change between the two months. The group as a whole recorded an increase of more than 4½ per cent.

What Industry Thinks of Industry Control

"Organized Labor and Unfair Employers May Profit Through Delaying Codes," says James W. Hook

JAMES W. HOOK
President, Geometric Tool Co.

JUST what is there about this Industrial Recovery Act that we don't like? We surely can't object to the opportunity it affords us to stamp out bad competitive practices that have been stifling our industry for so long. We can't object to uniform accounting systems and the opportunity to stop the practice of selling below cost. We can't object to be given the chance to stamp out the evils of trade-in allowances, secret rebates, unreasonably free servicing and copying of each other's designs. We cannot object to the opportunity of forcing our bad competitors to pay decent wages that the better among us already pay and refrain from exploiting labor to reduce costs and undercut our prices.

Every one of these bad practices has been deplored by legitimate industry for decades. Why, then, do we object now to letting Government back us in our efforts to eliminate them?

Some will say that we don't want Government nosing about in our business. We don't want to be hampered in the free exercise of our judgment by Government agents. We want our liberty, and are willing to put up with a good many evils in order that we may have it.

Well, that is one reason, of course, but I wonder if it is precisely the real and correct reason. Suppose the act had put the force of Government back of us just far enough (and no farther) to support us in dealing with the above evils. Would we have objected? I doubt it. By and large I believe we would have applauded such a high minded attitude of Government that recognized the difficulties that we as managers and owners must meet and that offered us Government backing in our efforts to eliminate them.

Managerial Veto Power Transferred

What we object to, I believe, is the fact that our Government, which is the Government of all the people regardless of their special interests, introduced into the new law some clauses that rather directly intimated that those who work in industry, as well as those who own and manage it, shall have some say about matters that directly affect them; such, for instance, as wages, hours and conditions of employment. This is by no means a new conception. The better employers of the country have long admitted employee opinion to help shape their policies. The difference is that in the past employers had a veto power which enabled them to shape their decisions as they desired and enforce them, regardless of any employee advice that had been given. Now the veto power is, by the Industrial Recovery Act, put into the hands of an agency of the Government whose decisions shall govern.

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IT is the interim between the present time and when codes become effective, believes Mr. Hook, that is fraught with danger through the exercise of opportunism. From the standpoint of the fair-minded employer, the sooner codes are put into effect, the better.

Mr. Hook's statement has particular reference to the metalworking industry and is part of his presentation of this subject to the National Machine Tool Builders' Association at the special meeting in Cleveland, July 13.

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We employers resent this usurpation of our prerogatives. We fear that the Government agency may not decide correctly or in line with our own judgment. We fear that it will be unduly influenced by labor and labor organizations. We fear that it will force us to forego profits in good times, to boost wages and thus leave us without reserves to carry us through bad times. We wonder if we can safely subordinate our own judgment in affairs dealing with business to the judgment of a Government agency.

Well, that remains to be seen. I've wondered just how I should feel if a Government agent came into my plant, pawed around over my books and records and finally ordered me to raise wages and reduce hours. I think I should feel pretty resentful and, perhaps, show my feelings in no uncertain manner. Yet, if upon reflection, I could feel assured that all of my competitors were being forced to operate under similar conditions, I think I might not feel so badly. That would be a condition, I would be forced to admit, that was not obtaining before the law was passed. It was a condition that I had always felt should obtain. Why, then, should I object to it now? For one reason so far as I can see. I would fear that the Government was not enforcing the law upon the others as it was on me.

Recourse Under Code

Well, there is a way around the objection. The law permits an industry to establish a code or set of rules under which it will operate. This code can be made to set forth the practices that are considered unfair competition and, therefore, taboo. It can be made to establish the relationship between employer and employee. All members of an industry, as well as employees in the industry, may have a say in establishing the code. Those who refuse to accept it, once a majority agrees upon it, will come under special scrutiny of the Government and even licensing in some cases by the Government to see that unfair practices are not engaged in. I can hardly conceive of a company being so stubborn as to force such special conditions upon itself.

Once a code is accepted, a company having reason to believe that a competitor is not living up to its requirements may file a complaint and bring the offending one on the carpet. Thus we have self-regulation backed by the

force of law to the extent that we desire to make ourselves the regulators.

Labor also comes within the control of the act once industry adopts a code and gets it accepted. Unfair action on the part of a labor union, or a group of workmen, may, if the code has been properly drawn, be penalized. This is something that is not possible now, except in special and well defined cases. The freedom of labor to attack a single unit in any industry will, I believe, be impossible if codes are properly drawn and lived up to by industry itself. There will doubtless be continuous pressure on the part of organized labor to increase wages and shorten hours, but Government would not dare let these demands go too far for fear of incurring a consumer war and endangering profits and the life of business itself.

Government Has an Interest in Preserving Profits

Of course, the Government could and probably will desire to see salaries reduced in the higher brackets as a means of helping to maintain high taxable profits with high wages, but its interest in profits themselves as a means of yielding revenue and encouraging capital investment is too great to warrant any fear that they will be permitted to disappear or even be materially reduced. With these incentives obtaining, and I cannot see how it would be possible for them not to obtain, industry would not have too much to fear. Knowing as it would know that labor conditions were equal in all competitive plants, it would, I believe, assume the role of arbiter and be less concerned than it is now over organized labor action.

All this, of course, if industry rises promptly to its opportunity under the act. If it delays it will find organized labor soliciting its employees to join established unions as a means of obtaining benefits under the act. If it acts with reasonable speed, presents a well thought out code and gets it accepted, agitation on the part of labor on the one hand and unfair employers who profit by bad competitive practices on the other hand will not get very far. The great opportunity for the organized groups in either of these fields lies in the interim between the present and the date when an industry begins to operate under a code. For that reason I urge that the great metal-working industry of which we are a part draw up its code just as quickly as it possibly can.

New Plant of Rotary Electric Steel Co. Nearing Completion

THIS is the first published photograph of the new plant of the Rotary Electric Steel Co., Detroit, now nearing completion. Within a short time this mill will begin to produce cold-drawn steel bars by a new revolutionary process whereby a charge of 100 per cent scrap is melted in an electric furnace, the melt poured into a centrifugal mold moving at high speed, the resulting circular two-ton blooms sheared into the desired number of arcuated sections and then, after being brought up to rolling temperature in a continuous heating furnace, rolled into billets on a three-high breakdown mill. In addition to eliminating ingots, soaking pits and blooming mill, necessary in making steel in the orthodox manner, the new process produces steel so closely grained as to be virtually free from banding and directional properties. The yield of homogeneous bloom is about 98 per cent, as against 80 per cent by the usual process.

THIS photograph shows the table on which the ring of steel, after being cast in a centrifugal molding machine, is laid to be cut into arc-shaped blooms. At the left is the saw and at the rear the shearing machine. The entire unit is motor-operated.

National Safety Council Lists "Safest" Plants

AN "honor roll" for 1932 has been issued by National Safety Council, Chicago. It lists the plants in various divisions of the metal-working industry which have made the best safety records for the past year. They are as follows:

Steel Companies

CORRIGAN McKINNEY STEEL CO., Cleveland. Best 1932 record in frequency among large plants—0.57; also in severity—0.05.

BETHLEHEM STEEL CORPN. The Steelton, Pa., plant has made the largest consistent improvement in frequency since 1930 among large units—67 per cent.

REPUBLIC STEEL CORPN. The South Chicago Works has the largest exposure among middle-sized units with a perfect 1932 record—1,100,000 man-hours.

UNION CARBIDE CO. The HAYNES STELLITE CO., a subsidiary located at Kokomo, Ind., has worked more hours than any other small unit with a perfect record—240,000.

PITTSBURGH STEEL CO. The Seamless Tube mill at Monessen, Pa., is the largest small unit to attain a perfect record in 1931 and again in 1932.

Foundries

NATIONAL BRASS CO., Detroit. Best 1932 record in frequency and severity among large brass and aluminum foundries—151,000 man-hours without a disabling injury.

U. S. ALUMINUM CO., Detroit. Leads small brass and aluminum foundries by working more hours without a disabling injury than any other unit—130,000 man-hours.

DODGE MANUFACTURING CO., Mishawaka, Ind. Lowest 1932 frequency rate among large foundries with machine shops—8.92; also lowest severity rate—0.10.

AMERICAN MANGANESE STEEL CO. The Chicago Heights, Ill., plant has the largest consistent improvement in frequency from 1930 to 1932 among large foundries with machine shops—68 per cent; also in severity—65 per cent.

MACKINTOSH-HEMPHILL CO., Pittsburgh. The Garrison plant at Pittsburgh has the best 1932 record among small foundries with machine shops—165,000 man-hours without a disabling injury.

LYCOMING MANUFACTURING CO., Williamsport, Pa. Best 1932 record in frequency among large gray iron foundries—5.91.

NATIONAL RADIATOR CORPN. The New Castle plant has the best 1932 record in severity among large gray iron foundries—0.05; also largest consistent improvement in frequency from 1930 to 1932—79 per cent; also in severity—89 per cent.

JAMES B. CLOW & SONS. Coshocton, Ohio, plant has best 1932 record among middle-sized gray iron foundries—122,000 man-hours without a disabling injury.

FRAMINGHAM FOUNDRIES, INC., Framingham, Mass. Larger exposure than any other small gray iron foundry with a perfect 1932 record—106,000 man-hours.

UNION SWITCH & SIGNAL CO., Swissvale, Pa. Its foundry division is the largest in the small gray iron group to show consistent improvement since 1930 and to make a perfect record for 1932.

MARION MALLEABLE IRON WORKS, Marion, Ind. Best 1932 record in frequency among large malleable iron foundries—10.89; also lowest severity, 0.09.

ARCADE MALLEABLE CO., Worcester, Mass. Largest consistent improvement in frequency since 1930 among small malleable iron foundries—67 per cent; also in severity 45 per cent.

HUNT-SPILLER MANUFACTURING CO., Boston, Mass. Best 1932 record in frequency among large steel foundries—4.50; also in severity—0.10.

THE KENSINGTON STEEL CO., Chicago, Ill. Leads small steel foundries by working more hours without a disabling injury than any other unit—99,000 man-hours. Also the largest unit to show 100 per cent improvement in both frequency and severity since 1930.

Metal Stampings and Metalware

AMERICAN CAN CO. Its Philadelphia plant has the best 1932 record among large plants—547,000 man-hours without a disabling injury. Also, the largest plant in its group to reduce both injury rates consistently since 1930 and to achieve a perfect record for 1932. The Oakland, Cal., plant worked more hours during 1932 than any other perfect-record middle-sized plant—277,000 man-hours. Also, the largest in its group to make consistent improvement in both injury rates since 1930, culminating in a perfect 1932 record.

LIGHTNING FASTENER CO., LTD., St. Catharines, Ontario. Larger exposure than any other small plant with a perfect 1932 record—203,000 man-hours.

CHASE CO. NOERA MANUFACTURING CO., a subsidiary, is the largest of the small plants to reduce both rates in 1931 over 1930 and attain a perfect record in 1932.

Miscellaneous Sheet Metal Products

KELVINATOR CORPN., Detroit, Mich. Lowest 1932 frequency rate among large plants—4.10; also lowest severity—0.02.

AMMIDON & CO., Baltimore, Md. Larger exposure than any other middle-sized plant with a perfect 1932 record—113,000 man-hours.

ST. LOUIS FIRE-PROOF DOOR CO., St. Louis, Mo. Larger exposure than any other small plant with a perfect 1932 record—55,000 man-hours.

C. C. JAMES CO., Grand Rapids, Mich. Largest of small plants to reduce both injury rates in 1931 and attain a perfect record in 1932.

Stove Manufacturing

MALLEABLE IRON RANGE CO., Beaver Dam, Wis. Lowest 1932 frequency rate among large units—1.92.

Tubular Products

PITTSBURGH VALVE & FITTING CO., Barberton, Ohio. Best 1932 record in frequency among large plants—2.61.

WARREN WEBSTER & CO., Camden, N. J. Best 1932 record in severity among large plants—0.002.

GENERAL ELECTRIC CO., The New Kensington, Pa., plant worked more hours during 1932 with a perfect record than any other small organization—209,000 man-hours.

B. F. SHAW, Wilmington, Del. Largest plant among small establishments to make consistent improvement since 1930, and to achieve a no-injury record during 1932.

Hardware Manufacturing

ORGILL BROTHERS, Memphis, Tenn. Larger exposure than any other middle-sized plant making a perfect 1932 record—292,500 man-hours.

Metal Furniture Manufacturing

REMINGTON RAND, INC. Best 1932 record among small plants—547,000 man-hours without a disabling injury.

THE HAMILTON MANUFACTURING CO., Two Rivers, Wis. Its steel and enamel plant has made the largest consistent reduction in frequency from 1930 to 1932 among small plants—64 per cent; also in severity—95 per cent.

To Set Date for Iron and Steel Code Hearings

WASHINGTON, July 18. — The date for hearings on the iron and steel code probably will be set in a day or two. In making this announcement today, General Hugh S. Johnson, Administrator of the National Recovery Administration, stated that it is likely that the hearing will be begun about seven days after the date is set. General Johnson and Deputy Administrator K. M. Simpson will preside at the hearing.

Blaw-Knox Co., Western Pipe & Steel Co., and Consolidated Steel Corpn., bidding in a group, are reported low on transmission towers between Boulder Dam and Los Angeles.

Road Cash for Utah, Ohio, Massachusetts

WASHINGTON, July 18.—Assignments of $26,276,400 roads cash for Ohio, Massachusetts and Utah from the Federal Public Works were cleared through the Bureau of Public Roads. Previously $22,330,101 was assigned within New York State. The public works program begun with these sums is being pushed rapidly. The Federal Public Works Act carries $400,000,000 for public works construction. The work will go on throughout the summer with the peak employment on roads scheduled for September. On the average highway for every $29.60 in payrolls on construction, $61.40 is spent on indirect payrolls resulting from production of materials, transportation, etc.

Crucible Steel Co. Resumes at Syracuse

Crucible Steel Co. of America, Inc., New York, has resumed operations at its plant on Magnolia Avenue, Syracuse, N. Y., known as Sanderson Brothers Steel Works, following curtailment for over two years. Employment will be given to about 150 men and this force will be stepped up in near future; normally, the mill employs about 800 men. It is said that plans are being considered for resumption at an auxiliary mill on Emerson Avenue, Syracuse, also shut down for many months.

All-Welded R.R. Coach For C. M. St. P. & P.

CHICAGO, Milwaukee, St. Paul & Pacific Railway has made an appropriation to its car shops at Milwaukee for the construction of an experimental passenger coach of streamline design costing $21,000 and to be ready for exhibition at the Century of Progress in Chicago early in the fall. The coach, designed by K. F. Nystrom, general superintendent of the Milwaukee car shop with the assistance of Dr. O. G. Tietjens, consulting engineer of Westinghouse. It will be 82 ft. long and seat 60 persons, and of all-welded construction. Due to the possibility of using thinner steel plates than in riveted design, the coach will weight about 100,000 lb., or 50,000 to 60,000 lb. less than the conventional coach. Because of the saving in metal cost, it will cost $13,000 less than a standard car. It is planned to build one coach at a time to replace existing equipment and when sufficient cars have been finished, combine them into a streamline train. The Milwaukee Road's program for the future calls for a locomotive shaped as nearly as possible like the snout of the pike. A rear-end coach will then be constructed with a tapering end, and the impression of the whole will be similar to that of this type of fish, as metal skirts will be hung from the bottom of the cars to conceal the wheels to make streamlining complete. A new type of wheel truck is being developed, brakes having cylinders so that the noise of airbrake application will be eliminated. Rubber cushions will be employed liberally as in automobile practice to eliminate noise and make riding smoother.

Dehue Mine Gets Safety Award

The Joseph A. Holmes Safety Association Certificate of Honor, a national safety honor, has been awarded the Dehue Mine of the Youngstown Mines Corpn., Dehue, W. Va., a subsidiary of the Youngstown Sheet & Tube Co., in recognition of the operation of the mine for 602 days without a fatality or loss of time because of accident with an average of 214 men involving 531,382 man hours and a production of 356,805 tons of coal. Presentation was made by Walter H. Tomlinson, senior instructor in the Safety Division of the U. S. Bureau of Mines. This mine also received a certificate of honor in 1932.

Electrical Code Sets Week of 36 Hrs.

MINIMUM wages of 35 cents an hour and a maximum 36-hour work week, with exceptions in the cases of casual and incidental laborers and learners, are proposed in the code of fair competition submitted July 12 to Administrator Hugh S. Johnson by the electrical manufacturing industry.

General Johnson scheduled public hearings on the code to begin July 19.

The code provides for uniform, standardized accounting in all manufacturing plants. Sales "below cost to the seller" are prohibited except "sales to meet existing competition" in the event such sales are allowed in a supplemental code. Another exception is sales of "dropped lines, seconds and inventories" if approved by a supervisory agency to be named by the association.

Price lists, including terms of payment, are to be circulated to all manufacturers where they are now in use and in other cases price lists may be prescribed by the supervisory agency which is also designated to receive periodical reports, plant capacity, volume of production, volume of sales in units and dollars, orders received, unfilled orders, stocks on hand, inventories, and other pertinent statistics to be furnished by every manufacturer.

Machine Tools Feel Recovery Pull

THE rising curve of industrial activity has engendered an increase in machine tool business during the past three weeks. The improvement is especially notable in the New York metropolitan district and adjoining areas.

New York dealers report a rising tide of purchases against inquiries for gages, dies, small tools and small precision lathes. A prominent Eastern concern has shipped several heavy machines, including lathes, drilling machines and heavy milling machines. Several tool manufacturers have stepped up production, and in several cases have eliminated customary layoff periods. The volume of current inquiry for light machines indicates improved operation among manufacturers for the remainder of the summer, although significant inquiry for heavy machines is not expected until industries become assured that present operating rates will be sustained.

Foreign demand revived several weeks ago as a result of the fall of dollar exchange. Export business, however, is still rather light.

Tool shops in the Chicago district are now beginning to pick up, and it is probable that one of the steel companies will soon buy several roll grinders.

Chicago & Great Western R. R. has ordered a wheel press, a draw cut shaper, a 36-in. lathe, a 24-in. lathe and an 18-in. lathe. Another concern has purchased a gear cutter, and the Goss Printing Press Co. has purchased $30,000 worth of turret lathes.

Automatic screw machine and turret lathe manufacturers have advanced prices 10 per cent, and milling machine makers are expected to follow suit.

Small tool sales are reported improved at practically all sources.

June Construction Contracts Up

CONSTRUCTION contracts of all descriptions awarded in the 37 states east of the Rocky Mountains during June totaled $103,255,500, according to F. W. Dodge Corpn. This was a gain of almost 34 per cent over the total of $77,171,700 shown for May. During June of last year the contract volume amounted to $113,075,000.

Breaking the June, 1933, contract total down, the Dodge organization indicates a total of $74,434,400 for privately-financed undertakings as distinguished from the total of $28,821,000 for publicly-financed work. Thus the total of private work dur-

ing June compares with only $53,487,500 for May and $48,806,800 in June, 1932.

Showing a further distribution of last month's awards as between major structural classifications, the current report gives a June total of $27,793,200 for residential building as against $26,519,700 for May, and only $23,116,200 for June 1932; non-residential building awards during June amounted to $51,024,400 as compared with $31,639,400 for May and $39,812,600 for June, 1932; awards for public works and public utilities during June, 1933, totaled $24,437,800.

Japan's Manchurian Steel Operations

THE Japanese Government has authorized the recently organized Showa Steel Works to take over the Anshan operation in Manchuria and to expand production facilities, according to a report received in the Iron and Steel Division of the Commerce Department from the Tokyo office.

A new plant which is to be built will produce pig iron, ingots, bars and various steel materials. The bulk of the plant's production is expected to be consumed in Manchuria, the report stated, although some export business is expected to the markets in China and the South Seas. Shipments to Japan are expected to be confined to the necessary amounts to make up deficiencies in Japanese domestic production.

A new tin plate plant is under construction in Yokohama and is expected to start production in August. It will have a rated capacity of about 20,000 metric tons annually. In addition the Government Steel Works expects to increase the capacity of its tin plate plant by about 50,000 tons.

Recommend Simple Viscosity Classifications

ORGANIZATION of a committee under the procedure of the American Standards Association to develop a simple and readily interpretable system of viscosity classification for industrial lubricants was recommended by more than 100 representatives of users and manufacturers of lubricants at the recent lubrication meeting held by the American Society of Mechanical Engineers at Pennsylvania State College.

Need of such a classification was evident from the fact that a number of associations, as well as a number of users of lubricants, were attempting to classify lubricants according to viscosity, said Dr. A. E. Becker, Standard Oil Development Co., New York, and chairman of the lubrication committee of the Society of Automotive Engineers, who was a speaker at the meeting. C. M. Larson, Sinclair Refining Co., endorsed Dr. Becker's suggestion for a practical classification system and analyzed the present need and the possibility of including at some later date a viscosity index and an extreme-pressure symbol in any classification system adopted.

At the conclusion of the meeting the lubrication engineering committee of the A.S.M.E. Petroleum Division appointed two special subcommittees to carry on the work of viscosity classification, pending the appointment of the A.S.A. committee. One subcommittee, to be known as a Refinery Viscosity Classification Committee and to be headed by Dr. Becker, is to develop further the suggestions made by Dr. Becker and Mr. Larson and to secure from oil refiners their comments and suggestions. The second committee, on Viscosity Needs of Users, will secure information on viscosity classifications now being used and on the necessary factors to be included in such classifications. William F. Parish is chairman. For the present the two committees will be limited to viscosity classification numbers.

"Facts and Figures of Automobile Industry"

IN 1932, according to the National Automobile Chamber of Commerce's 1933 edition of "Facts and Figures," published July 15, American automobile manufacturers produced 1,431,494 vehicles of which 1,186,209 were passenger cars and 245,285 were trucks. These vehicles had an aggregate wholesale value of $793,045,300. Parts, accessories and tires produced for replacement purposes raised the total wholesale value of the industry's output for the year to $1,555,998,480.

The industry maintained its position as one of the nation's largest manufacturing industries as measured by the value of finished products sold. Capital investment in car and truck factories alone amounted to $1,489,900,000. Motor factories gave employment directly to 229,841 workmen who received in salaries and wages $282,929,203. The industry provided work directly and indirectly to 3,900,000 wage-earners.

The motor industry continued to be the largest single consumer of such raw materials and commodities as steel, malleable iron, gasoline, rubber, plate glass, nickel, lead, mohair and upholstery leather.

Over 17 per cent of all steel produced during the year was used in the manufacture of motor vehicles and their accessories. The motor industry absorbed 77.6 per cent of the total output of alloy steel and 53.2 per cent of the total output of strip steel.

In addition, the industry consumed 80.4 per cent of the year's rubber output, 43 per cent of the plate glass output, 53 per cent of the upholstery leather output, 33 per cent of the lead output, 28 per cent of the nickel output, 85 per cent of the gasoline output and 14 per cent of the mohair output.

Five Months Iron and Steel Exports Up 200 Per Cent

WASHINGTON, July 18.—Exports of iron and steel scrap in the first five months of 1933 rose to 290,523 gross tons against 93,758 tons in the corresponding period of last year, according to a compilation prepared by A. C. Thompson of the Iron and Steel Division, Department of Commerce.

Countries	January	February	March	April	May	Five-Months of 1933	Five-Months of 1932
Belgium	200	11	....	147	190	548	391
Germany	21	6	2,041	12,104	1,697	15,869	1
Italy	7,563	3,568	14,780	7,765	7,565	41,241	508
Netherlands	2	....	27	25	....	54	68
Poland	....	....	4,326	4,092	4,952	13,370	....
United Kingdom	....	45	27	54	....	126	327
Canada	914	238	990	529	285	2,956	7,705
Nicaragua	....	....	....	....	220	220	....
Panama	1	....	....	....	....	1	....
Mexico	142	50	142	45	....	379	....
Dominican Republic	....	....	....	4	....	4	....
Chile	....	....	....	....	....	....	1
Peru	100	46	....	....	....	146	....
Venezuela	....	....	1	....	....	1	....
British India	....	....	2,000	....	....	2,000	....
China	182	148	464	596	809	2,199	1,661
Hong Kong	3	28	133	105	84	353	535
Japan	22,614	34,001	32,549	48,253	73,516	210,933	82,440
Philippine Islands	....	....	42	....	10	52	106
Iraq	71	....	....	....	....	71	....
Syria	....	....	....	....	....	....	15
Totals	31,813	38,141	57,522	73,719	89,328	290,523	93,758

Steel Code Enters National Industrial Arena

Its Course Will be Keenly Watched by Entire Metal-Working Industry and is Likely to Determine the Fate of Company Unions

By L. W. MOFFETT
Resident Washington Editor, The Iron Age

THE eagerly awaited steel code was presented to the Administrator on July 15. Were any explanations necessary as to why it was not forthcoming sooner, they are found in the text itself. This is printed in full in this issue. Regardless of the changes that may be brought about in its terms during the coming days of discussion and probable concentrated opposition by organized labor, it will be apparent that a vast amount of careful thought and intensive effort has been put into the preparation of this difficult study and declaration of control procedure.

All trade associations and other groups related to metal-working and machinery building, as well as all individual concerns in these industries will watch the fate of the proposed terms of this code with absorbing interest. For its hearings will determine the fate of the "open shop" and the company union; test the strength of organized labor forces that have been waiting for years an opportunity to "unionize" a hitherto impregnable industry and will clarify the Administration's attitude toward such attempts.

From the standpoint of the Administration, what will happen to this code is of equal interest and importance. If industry is "sold," as it has been to date, on the Administration's fair-minded attitude regarding labor relations, as expressed by General Johnson, it will mean a strong impetus for the President's recovery plan through the sincere cooperation of the employers of the great majority of labor, and any desire to delay codes in other branches of industry which have not yet come forward will be abated.

Limiting the work week to 40-hr., common labor wages at 25c. to 40c. an hr. and granting a 15 per cent increase for other classes of labor, the code was hailed by General Johnson with appreciation "of the intensive and continuous work of the executives of the industry" in its preparation. Although saying the Administration has given no preliminary sanction to any part of the code, General Johnson pointed out that "not even in wartime have I seen a more wholehearted, patient, and persistent effort on the part of the leaders of an industry to solve their internal problems and to bring about a solution which in their judgment would meet the needs of the present emergency."

As was to be expected, organized labor was critical of the code, particularly of the open shop principle which it stoutly upheld. President William Green of the American Federation of Labor attacked this feature, and also insisted that the hours of work and wage increases were unsatisfactory. Nevertheless, the Administration, passing by any comment on these features, was clearly pleased at the rapid response of the industry in announcing immediate increases of 15 per cent in wages.

Elaboration of Basing Points

The division of the industry into 21 districts and fixing of numerous basing points for different products was an elaboration and refinement of present practices, while price policies supplemented in greater detail the prevailing custom. Maintenance of prices to be filed with the Secretary of the Institute is required under penalty, thus marking a new policy. Also barring further construction of blast furnace, open-hearth and Bessemer capacity is an innovation. The list of unfair practices incorporated in the code likewise draws tight rules against injurious competition. While prices are not fixed, the code sets out a comprehensive system for building them on either basing points or on a delivered price basis. The latter must carry full freight rates in case of all-rail transportation, thus preventing "absorption" by manufacturers of a portion of the carrying charges, held to be a form of underselling. The elimination of employment in plants of any person under 16 years of age is required but is only incidental since the amount of so-called child labor in the industry is almost, if not entirely, negligible.

No Allocation Proposed

No specific means for controlling production or allocating output and sales was held to be necessary. The view is expressed in the code that elimination of unfair practices will automatically do away with overproduction and any inequities in distribution. However, adequate provision is made for the collection of statistics, to be filed with the Secretary of the Institute for inspection of the Board of Directors, regarding production and other data from which it may be determined whether overproduction exists and whether restriction of output is necessary. According to Mr. Lamont, the board is representative of 80 per cent of the industry.

In setting up methods for making prices and terms of payment, members are required to adhere to those filed with the Secretary and cannot differentiate between buyers on either spot or contract sales. Unfair practices, detailed in one of nine schedules car-

ried in the code, come within the meaning of the Federal Trade Commission. They constitute a violation of the code.

Prices and Terms of Payment

Under Schedule F elaborate and detailed provisions are made regarding prices and terms of payment. Basing points in all sections of the country, east to the West and north to the South, are established for specified products. Members must adhere to prices fixed f.o.b. basing points or delivered, both for base levels and extras, the prices to be filed with the Secretary.

Free credit is the period of time between the date of a shipment and the date after which the purchaser shall be required to pay interest on the purchase price. Interest is to be at the current rate. Prices are to be filed by each member of the code within 10 days after it becomes effective. No changes are to be made except by filing supplemental lists and are not to become effective until 10 days after such filing.

The system of discounts is continued on pipe, but, in the case of oil country tubular goods, sellers are required to file in lieu of a list of base prices a price list and one or more basing discount lists from which the delivered prices of such goods shall be determined. The nearest basing points are to be used for establishing prices by mills not located at a basing point. Standard rails still are to be quoted on a mill basis, except on coastal shipments c.i.f. quotations are called for. Full rail or water rates are to be included in delivered prices. Gulf and Pacific ports are included among the basing points. In milling-in-transit freight charges are to include delivery to point of consumption and not simply to the point of fabrication. Allowances will be made for lower rates when lower than all-rail rates. Fabricating discounts are continued and must be filed with the Secretary.

Pricing and Settlement Procedure

Where a manufacturer's contracts for certain products are in effect involving 20 per cent or more of the product produced or sold in the United States in 1932, other members may sell at the same price as that carried in the contract during the remainder of its life. Apparently this is aimed to do away with low-priced, long and exclusive contracts which has the effect of wiping out competition. It also seems to be designed to prevent injustice to customers not able to obtain such favorable terms. The Board is given power to adjust new price lists to the level of standard lists if it thinks the new list creates unfair competition.

Under the discount system provision is made for settlements three times per month. Maximum cash discounts are set up and interest required after expiration of the free credit period. The maximum period of free credit is 45 days on shipments from the plant of production east of the Mississippi River to the Pacific Coast. In other cases the maximum is 30 days. A cash discount of ½ of 1 per cent is allowed on shipments to the Pacific Coast for payment within 25 days. All other discounts are at the rate of ½ of 1 per cent for 10 days from the date of invoice. The provision for settlement three times each month is said to be made as a matter of convenience in auditing.

A system of uniform extras is set up, rates of such extras and deductions to be approved by the board. Practices governing the domestic pricing policy are waived as to export. The existing export price and other policies as agreed upon among exports under the Webb-Pomerene act are: Shipping on consignment, except as to pipe, is eliminated, but the rule does not become effective until June 30, 1934. Also contracts are to be limited to a three-month period, except for specific work where consumers have contracts with third parties at fixed prices. Present contracts are declared to be valid provided they are made at definite fixed prices or can be determined. On any contracts running beyond Dec. 31, 1933, members must file copies with the Secretary in order that the board may inspect them.

Penalty Is $10 Per Ton

Each violation of the code is subject to a penalty of $10 for every ton of steel sold, either by the manufacturer or jobber, in violation of the code with certain exceptions. The money is to be paid to the Treasurer of the code as "liquidated damages," except in cases for which liquidated damages are fixed and in cases which shall give rise to actions in tort (civil action) the Board is given the power to establish the amount of liquidated damages for committing an unfair practice.

Resembling the cartel or old steel pool system, funds from penalties under the latter provision are to be prorated among or credited to members not guilty of unfair practices. The prorata share is to be computed on the same basis as the last previous assessment made against a member on account of the expense of administering the code. A plan of equality for liability for violations is set up and violators are required to assign to the Treasurer all rights and causes of action.

The penalty provisions, however, carry a clause by which upon a two-thirds vote of the board it may waive liability for liquidated damages or refund them, if paid, if it decided that the violation was innocently made.

Code of Fair Competition of the Iron and Steel Industry

ARTICLE I
DEFINITIONS.

WHEREVER used in this Code or in any schedule appertaining hereto the terms hereinafter in this Article and in Schedule F annexed hereto defined shall, unless the context shall otherwise clearly indicate, have the respective meanings hereinafter in this Article and in such Schedule F set forth. The definition of any such term in the singular shall apply to the use of such term in the plural and vice versa.

Section 1.—The term "the United States" means and includes all of the territory of the United States of America on the North American continent.

Section 2.—The term "the President" means the President of the United States of America.

Section 3.—The term "the Industry" means and includes the business of producing in the United States and selling pig iron, iron or steel ingots and rolled or drawn iron or steel products, or any of them.

Section 4.—The term "member of the Industry" means and includes any person, firm, association or corporation operating a plant or plants in the United States for the production of pig iron, iron or steel ingots and rolled or drawn iron or steel products, or any of them.

Section 5.—The term "the Code" means and includes this Code and all schedules annexed hereto as originally approved by the President and all amendments hereof and thereof made as hereinafter in Article XII provided.

Section 6.—Except as otherwise required by the provisions of Section 4 of Article XI of the Code, the term "member of the Code" means any member of the Industry who shall have become a member of the Code as hereinafter in Section 3 of Article III provided.

Section 7.—The term "the Institute" means American Iron and Steel Institute, a New York membership corporation.

Section 8.—The term "the Board of Directors" means the Board of Directors (as from time to time constituted) of the Institute.

Section 9.—The term "the Secretary" means the secretary of the Institute at the time in office.

Section 10.—The term "the Treasurer" means the treasurer of the Institute at the time in office.

Section 11.—The term "unfair practice" means and includes any act described as an unfair practice in Schedule I annexed hereto.

Section 12.—Wherever used in the Code with reference to the Industry or any member of the Industry or any member of the Code, unless the context shall otherwise clearly indicate,

(a) the term "products" includes only pig iron, iron or steel ingots and rolled or drawn iron or steel products;

(b) the term "plant" means only a plant for the production of one or more products in the Industry;

(c) the term "prices" includes only prices for products produced in the Industry;

(d) the term "wages" includes only wages for labor performed in the Industry;

(e) the term "labor" means only labor performed in the Industry;

(f) the term "hours of labor" or "hours of work" includes only hours of labor or hours of work in the Industry; and

(g) the term "employee" means only an employee in the Industry.

Section 13.—The term "the National Industrial Recovery Act" means the National Industrial Recovery Act as approved by the President June 16, 1933.

Section 14.—The term "the effective date of the Code" means the date on which the Code shall have been approved by the President pursuant to the National Industrial Recovery Act.

ARTICLE II

PURPOSE OF THE CODE.

Section 1.—The Code is adopted pursuant to Title I of the National Industrial Recovery Act.

Section 2.—The purpose of the Code is to effectuate the policy of Title I of the National Industrial Recovery Act in so far as it is applicable to the Industry.

ARTICLE III

MEMBERSHIP IN THE CODE.

Section 1.—It is of the essence of the Code that all members of the Industry which shall comply with the provisions of the Code shall be entitled to participate in its benefits upon the terms and conditions set forth in the Code.

Section 2.—Any member of the Industry is eligible for membership in the Code.

Section 3.—Any member of the Industry desiring to become a member of the Code may do so by signing and delivering to the Secretary a letter substantially in the form set forth in Schedule A annexed hereto.

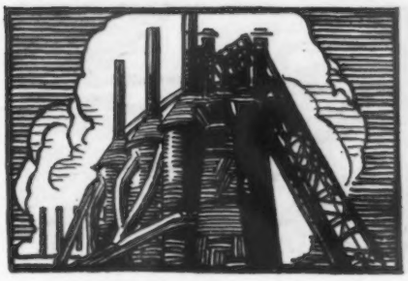
Section 4.—The rules and regulations in respect of meetings of members of the Code are set forth in Schedule B annexed hereto.

ARTICLE IV

HOURS OF LABOR, RATES OF PAY AND OTHER CONDITIONS OF EMPLOYMENT.

Section 1.—Pursuant to subsection (a) of Section 7 of the National Industrial Recovery Act and so long as the Code shall be in effect, the Code shall be subject to the following conditions:

(1) That employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such



representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection;

(2) that no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and

(3) that employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

Section 2.—The plants of the Industry are open to capable workmen, without regard to their membership or non-membership in any labor organization. The Industry firmly believes that the unqualified maintenance of that principle is in the interests of its employees.

For many years the members of the Industry have been and now are prepared to deal directly with the employees of such members collectively on all matters relating to their employment. The principles of collective bargaining under which certain members of the Industry have dealt with their employees are embodied in Employee Representation Plans, which are now in force at plants of members of the Industry generally. The fundamental principles of such plans are set forth in Schedule C annexed hereto. It is the belief of the Industry that the method of collective bargaining set forth in such plans provides for a day-to-day adjustment of all matters relating to the employment of employees in the Industry and at the same time insures to such employees a knowledge and understanding of the conditions of the business of their employer which they would otherwise be unable to obtain; that such principles should be maintained; and that the rights of the employees and members of the Industry to bargain collectively* through representatives elected or appointed and acting in accordance with such plans without interference, restraint or coercion of any sort should be preserved and protected.

Section 3.—Since the beginning of the present depression and the consequent reduction in the total number of hours of work available in the Industry, its members have made every effort to distribute, and with a remarkable degree of success have distributed, the hours of work available in their plants so as to give employment to the maximum number of employees. It is the intention of the Industry to continue that policy in so far as practicable, to the end that the policy of Title I of the National Industrial Recovery Act may be effectuated, and that work in the Industry shall in so far as practicable be distributed so as to provide employment for the employees normally attached to the Industry. The basic processes in the Industry are of a continuous character and they cannot be changed in this respect without serious adverse effect upon production and employment. As demand for the products of the Industry and, therefore, for labor shall increase, hours of labor for employees in the Industry must necessarily increase; but, except in the case of executives, those employed in supervisory capacities and in technical work and their respective staffs and those employed in emergency work, in so far as practicable and so long as employees qualified for the work required shall be available in the respective localities where such work shall be required and having due regard for the varying demands of the consuming and processing industries for the respective products, none of the members of the Code shall cause or permit any employee to work at an average of more than 40 hours per week in any six months period. For the purposes of this Section 3 the first six months period for each employee in the employ of any member of the Code at the effective date thereof shall begin with that date, and the first six months period for any employee thereafter employed by any member of the Code shall begin with the date of employment of such employee by such member. After the date of the employment by any member of the Code of any employee such member shall not knowingly permit such employee who also shall have performed work for one or more other employers to work for such member such number of hours as would result in a violation of the Code had all such work been performed for such member.

Section 4.—None of the members of the Code shall knowingly employ in or about its plants in the Industry any person under 16 years of age.

Section 5.—Throughout the history of the Industry geographical wage differentials have existed, due in the main to differences in living costs and general economic conditions and the ability adequately to man the industries in the respective localities. The establishments in the Industry in the different localities have been developed under such differences in wages and, after a survey of the matters bearing on such differences in the various sections of the United States, for the purposes of this Article IV the wage districts described in Schedule D annexed hereto have been established.

Section 6.—Until changed by amendment of the Code as hereinafter in Article XII provided, the minimum rates of pay per hour which shall be paid by members of the Code for common labor (not including that of apprentices and learners) in the Industry in the respective wage districts described in such Schedule D shall be the rates set forth in Schedule E annexed hereto. None of the members of the Code shall pay common laborers (not including apprentices and learners) in its employ in the Industry in any such district any rate of pay less than the rate specified for such district in such Schedule E, and any violation of this provision of the Code shall be deemed an unfair practice. Such rates of pay shall not, however, be understood to be the maximum rates of pay for their respective districts, but, until changed as aforesaid, none of the members of the Code shall be required to pay its common laborers in the Industry in any of such districts a rate of pay higher than the rate specified for such district in such Schedule E, except as such member shall have agreed to pay such higher rate in any agreement heretofore or hereafter made by such member with its employees. Until this provision shall have been changed by amendment as aforesaid, each member of the Code will pay to each of its employees in the Industry who on July 14, 1933, was receiving a rate of pay per hour in excess of the rate of pay per hour then being paid by such member for common labor a rate of pay per hour which shall be at least 15 per cent greater than that which such employee was then receiving; provided, however, that the foregoing provision shall not be so construed as to require any member of the Code to make any increase in the rate of pay per hour to be

paid by such member to any of its employees in any wage district that will result in a rate of pay per hour which shall be higher than the rate of pay per hour paid to employees doing substantially the same class or kind of labor in the same wage district by any other member of the Code which shall have increased its rates of pay per hour in accordance with such provision. In the case of employees (not including apprentices and learners) performing work for which they are paid per piece of work performed, the minimum rate of pay which each member of the Code shall pay for such work shall be sufficient to produce at the average rate of performance of such work at the time prevailing at the plant of such member where such work is performed the minimum rate of pay per hour provided in the Code for common labor at such plant.

ARTICLE V

PRODUCTION AND NEW CAPACITY.

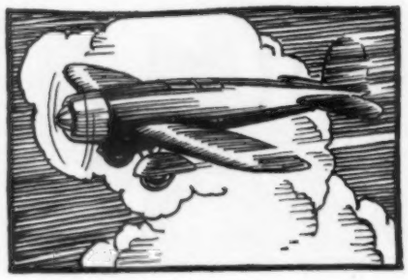
Section 1.—It is the consensus of opinion in the Industry that it is not necessary, in order to effectuate the policy of Title I of the National Industrial Recovery Act, to make any specific provision in the Code for controlling or regulating the volume of production in the Industry or for allocating production or sales among its members. It is believed that the elimination of unfair practices in the Industry will automatically eliminate any overproduction therein and any alleged inequities in the distribution of production and sales among its members. Adequate provision shall be made under the Code for the collection of statistics regarding production and of other data from which it may be determined from time to time whether overproduction in the Industry exists and whether in the circumstances any restriction of production is necessary in order to effectuate the policy of such Title I. Should it at any time in the circumstances as they shall then exist appear to the Board of Directors that the policy of such Title I will not be effectuated in the Industry because of the fact that through the Code production therein is not controlled and regulated, then the Board of Directors is hereby empowered, subject to the approval of the President after such conference with or hearing with interested persons as he may prescribe, to make, modify or rescind such rules and regulations for the purpose of controlling and regulating production in the Industry, including the fixing of such liquidated damages for vio'ations of such rules and regulations, as such Board shall deem to be necessary or proper in order to effectuate the policy of such Title I. All such rules and regulations from time to time so made and in effect shall be binding upon each member of the Code to which notice thereof shall have been given.

Section 2.—It is also the consensus of opinion in the Industry that, until such time as the demand for its products cannot adequately be met by the fullest possible use of existing capacities for producing pig iron and steel ingots, such capacities should not be increased. Accordingly, unless and until the Code shall have been amended as hereinafter provided so as to permit it, none of the members of the Code shall initiate the construction of any new blast furnace or open hearth or Bessemer steel capacity.

ARTICLE VI

ADMINISTRATION OF THE CODE.

Section 1.—The administration of the Code shall be under the direction of the Board of Directors. The Board of Directors shall have all the powers and duties conferred upon it by the Code and generally all such other powers and duties as shall be necessary or proper to enable it fully to administer the Code and to effectuate its purpose.



Section 2.—The Secretary shall act as Secretary under the Code. Under the direction of the Board of Directors, he shall keep all books (except books of account) and records under the Code and, except as such Board shall otherwise provide, shall collect, file and collate all statistics and other information required by the Board of Directors for the proper administration of the Code.

Section 3.—The Treasurer shall act as Treasurer under the Code and, under the direction of the Board of Directors, he shall have custody of, and have charge of the disposition of all funds collected under the Code; and he shall keep proper books of account showing the collection and disposition thereof.

Section 4.—The Board of Directors shall have power from time to time (a) to appoint and remove, and to fix the compensation of, all such other officers and employees and all such accountants, attorneys and experts, as said Board shall deem necessary or proper for the purpose of administering the Code and (b) to fix the compensation of the Secretary and the Treasurer for their services in acting under the Code.

Section 5.—The expenses of administering the Code shall be borne by the members thereof. The Board of Directors may from time to time make such assessments on account of such expenses against the members of the Code as it shall deem proper and such assessments shall be payable as such Board shall specify. The part of such expenses which shall be assessed against each member of the Code shall bear the same relation to the total thereof as the number of votes which, pursuant to the provisions of the Code, such member might cast at a meeting of the members thereof held at the time of any such assessment shall bear to the total number of votes that might be cast thereat by all the then members of the Code. Failure of any member of the Code to pay the amount of any assessment against such member for a period of thirty days after the date on which it became payable shall constitute a violation of the Code.

Section 6.—The Board of Directors may from time to time appoint such committees as it shall deem necessary or proper in order to effectuate the purpose of the Code, and it may delegate to any such committee generally or in particular instances such of the powers and duties of the Board of Directors under the Code as such Board shall deem necessary or proper in order to effectuate such purpose. Any member of any such committee may be a member of the Board of Directors or an officer or a director of a member of the Code or a person not having any official connection with any member of the Code or with the Institute, as the Board of Directors shall deem proper.

ARTICLE VII

PRICES AND TERMS OF PAYMENT.

None of the members of the Code shall make any sale of any product at a price or on terms and conditions more favorable to the purchaser thereof than the price, terms or conditions established by such member in accordance with the provisions of Schedule F annexed hereto and in effect at the time of such sale; nor, except as otherwise provided in such Schedule F, shall any member of the Code make any contract of sale of any product at a price or on terms and conditions more favorable to the purchaser thereof than the price, terms and conditions established as aforesaid and in effect at the time of the making of such contract of sale.

ARTICLE VIII

UNFAIR PRACTICES.

For all purposes of the Code the acts described in Schedule I annexed hereto shall constitute unfair practices. Such unfair practices and all other practices which shall be declared to be unfair practices by the Board of Directors as provided in paragraph M of such Schedule I or by any amendment to the Code adopted as hereinafter in Article XII provided and at the time in effect shall be deemed to be unfair methods of competition in commerce within the meaning of the Federal Trade Commission Act as amended, and the using or employing of any of them shall be deemed to be a violation of the Code, and any member of the Industry which shall directly, or indirectly through any officer, employee, agent or representative, knowingly use or employ any of such unfair practices shall be guilty of a violation of the Code.

ARTICLE IX

REPORTS AND STATISTICS.

Section 1.—The Board of Directors shall have power from time to time to require each member of the Code to furnish to the Secretary for the use of the Board of Directors such information concerning the production, shipments, sales and unfilled orders of such member and the hours of labor, rates of pay and other conditions of employment at the plant or plants of such member and such other information as the Board of Directors shall deem necessary or proper in order to effectuate the purpose of the Code and the policy of Title I of the National Industrial Recovery Act. The Board of Directors may require that any such information be furnished periodically at such times as it shall specify and may require that any or all information furnished be sworn to or otherwise certified or authenticated as it shall prescribe. Failure of any member of the Code promptly to furnish to the Secretary information required by the Board of Directors and substantially in the form prescribed by it shall constitute a violation of the Code. The Board of Directors shall not require any information regarding trade secrets or the names of the customers of any member of the Code.

Section 2.—Any or all information furnished to the Secretary by any member of the Code shall be subject to checking for the purpose of verification by an examination of the books and accounts and records of such member by any accountant or accountants or other person or persons designated by the Board of Directors and shall be so checked for such purpose, if the Board of Directors shall require it. The cost of each such examination shall be treated as an expense of administering the Code; **provided, however,** that, if upon such examination any such information shall be shown to have been incorrect in any material respect, such cost shall be paid by the member of the Code which furnished such information.

Section 3.—The Board of Directors shall require the members of the Code from time to time to furnish such information as shall be necessary for the proper administration of the Code.

Section 4.—To the extent that the Board of Directors may deem that any information furnished to the Secretary in accordance with the provisions of the Code is of a confidential

character in the interest of the member of the Code which shall have furnished it and that the publication thereof is not essential in order to effectuate the policy of Title I of the National Industrial Recovery Act, such information shall be treated by the Board of Directors and by the other members of the Code, if any knowledge of it shall have come to them, as strictly confidential; and no publication thereof to anyone or in any manner shall be made other than in combination with similar information furnished by other members of the Code, in which case the publication shall be made only in such manner as will avoid the disclosing separately of such confidential information.

ARTICLE X

PENALTIES AND DAMAGES.

Section 1.—Any violation of any provision of the Code by any member of the Industry shall constitute a violation of the Code by such member.

Section 2.—Recognizing that the violation by any member of the Code of any provision of Article VII or of Schedule F of the Code will disrupt the normal course of fair competition in the Industry and cause serious damage to other members of the Code and that it will be impossible fairly to assess the amount of such damage to any member of the Code, it is hereby agreed by and among all members of the Code that each member of the Code which shall violate any such provision shall pay to the Treasurer as an individual and not as treasurer of the Institute, in trust, as and for liquidated damages the sum of $10 per ton of any products sold by such member in violation of any such provision.

Section 3.—Except in cases for which liquidated damages are fixed in the Code and in cases which shall give rise to actions in tort in favor of one or more members of the Code for damages suffered by it or them, the Board of Directors shall have power from time to time to establish the amount of liquidated damages payable by any member of the Code upon the commission by such member of any act constituting an unfair practice under the Code and a list of the amounts so fixed shall from time to time be filed with the Secretary. Upon the commission by any member of the Code of any act constituting an unfair practice under the Code and for which liquidated damages are not fixed in the Code or which does not give rise to an action in tort in favor of one or more members of the Code for damages suffered by it or them, such members shall become liable to pay to the Treasurer as an individual and not as treasurer of the Institute, in trust, liquidated damages in the amount at the time established by the Board of Directors for such unfair practice and specified in the list then on file with the Secretary as aforesaid.

Section 4.—All amounts so paid to or collected by the Treasurer under this Article X or under Section 4 of Schedule F of the Code shall be held and disposed of by him as part of the funds collected under the Code and each member of the Code not guilty of the unfair practice in respect of which any such amount shall have been paid or collected shall be credited with its **pro rata** share of such amount on account of any and all assessments (other than damages for violation of any provision of the Code) due or to become due from such member under the Code, such **pro rata** share to be computed on the same basis as the last previous assessment made against such member on account of the expenses of administering the Code as hereinbefore in Section 5 of Article VI provided. All rights of any person who shall at any time be the Treasurer in respect of any amounts which shall be payable to him because of the commission by any member of the Code of any

act constituting an unfair practice under the Code, whether payable under the provisions of this Article X or under any other provision of the Code, shall pass to and become vested in his successor in office upon the appointment of such successor.

Section 5.—Each member of the Code by becoming such member agrees with every other member thereof that the Code constitutes a valid and binding contract by and among all members of the Code and that, in addition to all penalties and liabilities imposed by statute, any violation of any provision of the Code by any member thereof shall constitute a breach of such contract and shall subject the member guilty of such violation to liability for liquidated damages pursuant to the provisions of the Code. Each member of the Code by becoming such member thereby assigns, transfers and delivers to the Treasurer as an individual and not as treasurer of the Institute, in trust, all rights and causes of action whatsoever which shall thereafter accrue to such member under the Code for such liquidated damages by reason of any violation of the Code by any other member thereof, and thereby designates and appoints, the Treasurer as such individual the true and lawful attorney-in-fact of such member to demand, sue for, collect and receipt for any and all amounts which shall be owing to such member in respect of any such right or cause of action, and to compromise, settle, satisfy and discharge any such right or cause of action, all in the name of such member or in the name of the Treasurer individually, as he shall elect.

Section 6.—Anything in the Code to the contrary notwithstanding, the Board of Directors by the affirmative vote of two-thirds of the whole Board may waive any liability for liquidated damages imposed by or pursuant to any provision of the Code for any violation of any provision thereof, if in its discretion it shall decide that such violation was innocently made and that the collection of such damages will not to any material extent tend to effectuate the policy of Title I of the National Industrial Recovery Act.

ARTICLE XI

GENERAL PROVISIONS.

Section 1.—Any notice, demand or request required or permitted to be given to or made upon any member of the Code shall be sufficiently given if mailed postage prepaid addressed to such member at the address of such member on file with the Secretary. A waiver in writing signed by any member of the Code of any such notice, demand or request and delivered to the Secretary shall be deemed to be the equivalent of a notice, demand or request duly given or made, whether or not such waiver was signed and delivered before the time when such notice, demand or request was required or permitted to be given or made.

Section 2.—Nothing contained in the Code shall be deemed to constitute the members of the Code partners for any purpose. None of the members of the Code shall be liable in any manner to anyone for any act of any other member of the Code or for any act of the Board of Directors, the Treasurer or the Secretary, or any committee, officer or employee appointed under the Code. None of the members of the Board of Directors or of any committee appointed under the Code, nor the Treasurer, nor the Secretary, nor any officer or employee appointed under the Code, shall be liable to anyone for any action or omission to act under the Code, except for his wilful misfeasance or nonfeasance. Nothing contained in the Code shall be deemed to confer upon anyone other than a member of the Code any right, claim or demand whatsoever against any member of the Code or against any member of the Board of Directors or of any committee appointed under the Code or against the Treasurer or the Secretary or any officer or employee appointed under the Code.

Section 3.—As soon as members of the Industry which would, if then members of the Code, have the right to cast at least 75 per cent of all the votes that might be cast at a meeting of the members of the Code, if all members of the Industry were then members of the Code and present at such meeting, shall sign and deliver to the Secretary letters substantially in the form set forth in Schedule A annexed hereto, the Board of Directors shall submit the Code to the President pursuant to the provisions of Title I of the National Industrial Recovery Act and, upon the approval of the Code by the President pursuant to the provisions of such Title I, it shall constitute a binding contract by and among the members of the Code and the provisions thereof shall be the standards of fair competition for the Industry; **subject, however,** to amendment or termination as hereinafter in Article XII provided.

Section 4.—To the extent required or permitted by or under the provisions of Title I of the National Industrial Recovery Act the provisions of the Code shall apply to and be binding upon every member of the Industry, whether or not such member shall be a member of the Code. To the extent that it shall be necessary or proper in order to effectuate the purpose of the Code, the term "member of the Code" wherever used in the Code shall be deemed to mean a member of the Industry, but no member of the Industry which shall not also be a member of the Code shall be entitled to vote at any meeting of members of the Code or to any other right, power or privilege provided in the Code for the members thereof.

Section 5.—The Board of Directors shall have power from time to time to interpret and construe the provisions of the Code, including, but without any limitation upon the foregoing, the power to determine what are products within the meaning of that term as it is used in the Code. Any interpretation or construction placed upon the Code by the Board of Directors shall be final and conclusive upon all members of the Code.

Section 6.—Pursuant to subsection (b) of Section 10 of the National Industrial Recovery Act, the President may from time to time cancel or modify any order, approval, license, rule or regulation issued under Title I of said Act.

ARTICLE XII

AMENDMENTS.—TERMINATION.

The Code may be amended at any time in the manner hereinafter provided. The changing of any schedule hereto or the addition hereto of any new schedule shall constitute an amendment of the Code. All amendments shall be proposed by the Board of Directors by vote of the majority of the members thereof at the time in office. Each amendment so proposed shall be submitted to a meeting of the members of the Code which shall be called for such purpose upon notice given in accordance with the provisions of Section 1 of Schedule B and Section 1 of

Article XI of the Code. If at such meeting members of the Code having the right to cast at least 75 per cent of all the votes that might be cast at such meeting, if all the members of the Code were present thereat, shall vote in favor of the adoption of such amendment, such amendment shall be submitted by the Board of Directors to the President for approval, if approval thereof by him shall then be required by law. Every such amendment shall take effect as a part of the Code upon the adoption thereof by the members of the Code as above provided and the approval thereof by the President, if approval thereof by him shall be required as aforesaid.

The Code shall continue in effect for a period of 90 days after the effective date of the Code and thereafter until terminated as hereinafter provided. It may be terminated at any time after the expiration of such period by the same action by members of the Code as is above provided for the amendment thereof. When so terminated all obligations and liabilities under the Code shall cease, except those for unpaid assessments theretofore made in accordance with the provisions of the Code and those for liquidated damages theretofore accrued under any provision of the Code.

SCHEDULE A

(Letter of Acceptance of Code by Member Company)

SCHEDULE B

THE RULES AND REGULATIONS IN RESPECT OF MEETINGS OF MEMBERS OF THE CODE.

Section 1.—A meeting of members of the Code may be called and held at any time by order of the Board of Directors, or by members of the Code having the right to cast at least 50 per cent of all the votes that might be cast at such meeting, if all the members of the Code were present thereat, on not less than three days' notice to each of such members stating the time and place of such meeting and the purposes thereof.

Section 2.—At each meeting of the members of the Code each member thereof shall have as many votes as shall equal the quotient obtained by dividing by 500,000 the aggregate amount in dollars of the invoiced value of the products delivered by such member for consumption within the United States during the preceding calendar year. Fractions in such quotient shall be disregarded; **provided, however,** that each member of the Code shall have at least one vote. All questions as to the number of votes which each member of the Code shall be entitled to cast at any meeting of the members thereof shall be determined by the Board of Directors. Any person or firm who shall be a member of the Code may, and any association or corporation which shall be a member of the Code shall, vote at meetings of the members of the Code by proxy in writing duly executed by such member and filed with the Secretary. Any such proxy may be for a specified meeting or be a general proxy for any or all meetings that may be held until such proxy shall have been revoked by an instrument in writing duly executed by the member of the Code which gave such proxy and filed with the Secretary.

Section 3.—At each meeting of the members of the Code, members thereof having the right to cast at least 75 per cent of all the votes that might be cast at such meeting, if all the members of the Code were present thereat, shall constitute a quorum for the transaction of business at such meeting.

SCHEDULE C

FUNDAMENTAL PRINCIPLES OF EMPLOYEE REPRESENTATION PLANS.

The fundamental principles of Employee Representation Plans in the Industry are substantially as follows:

1. There shall not be any discrimination against any employee because of race, sex or creed, or any impairment of or any interference with any right of such employee to belong to or not to belong to any lawful society, fraternity, union or other organization.

2. Employees shall have the right to hold elections of their representatives at least once in each calendar year.

3. In order to avoid intimidation from any source whatsoever, nominations of candidates for election shall be made by secret ballot and elections from among candidates so nominated shall also be by secret ballot. Such nominations and elections shall be held on the premises of the employer where the employees participating therein are employed at times and places in each case convenient for such employees and after ample notice thereof to them.

4. The candidates nominated and the representatives elected shall be chosen from among the employees who shall not participate in the management of the business of their employer. The representatives so chosen shall be sufficient in number and from among the employees in the different types of labor so that each such type shall be fairly represented.

5. Duly elected representatives of the employees shall have the right to hold their meetings without the attendance thereat of any representative of the management of their employer.

6. Procedure shall be maintained whereby duly elected representatives of the employees may confer jointly with one or more representatives of their employer at regular intervals, to the end that such representatives shall have full opportunity for fair and unhampered discussion with such representative or representatives of such employer of any topic of mutual interest.

7. In case the duly constituted representatives of the employees or committees of such representatives shall be unable to agree with the duly constituted representatives of their employer upon any question relating to hours of labor, rates of pay and other conditions of employment, procedure for appeal shall be maintained,—if necessary, to the head of such employer (in the case of a corporation, to its chief executive officer) responsible (in case the employer shall be a corporation, under its Board of Directors) for the management of the business of such employer, with a view to a final decision that shall be just and fair as between the parties interested.

8. Such plans shall be so operated as to insure to such representatives of the employees full protection in the conscientious representation of their constituents.

SCHEDULE D

DESCRIPTION OF WAGE DISTRICTS.

1—**Eastern District:**
Comprises that part of the United States which is north of the State of Virginia and east of a line drawn north and south through the most easterly point of Altoona, Pennsylvania; that part of the State of Maryland which is west of such line; and the Counties of Monongalia, Marion and Harrison in the State of West Virginia.

2—**Johnstown District:**
Comprises Cambria County and City of Altoona in the State of Pennsylvania.

3—**Pittsburgh District:**
Comprises the Counties of Westmoreland, Fayette, Greene, Washington, Allegheny, Beaver, Butler, Armstrong and Jefferson and that part of the County of Clearfield which is west of a line drawn north and south through the most easterly point of Altoona, all in the State of Pennsylvania.

4—**Youngstown Valley District:**
Comprises the Counties of Lawrence, Mercer and Venango in the State of Pennsylvania and the Counties of Trumbull, Mahoning and Columbiana in the State of Ohio.

5—**North Ohio River District:**
Comprises the cities along the Ohio River north of the City of Parkersburg, West Virginia, and the Counties of Belmont and Jefferson in the State of Ohio and the Counties of Marshall, Ohio, Brook and Hancock in the State of West Virginia.

6—**Canton, Massillon and Mansfield District:**
Comprises the Counties of Stark, Tuscarawas, Summit and Richland in the State of Ohio.

7—**Cleveland District:**
Comprises the Counties of Ashtabula, Lake, Cuyahoga and Lorain in the State of Ohio.

8—**Buffalo District:**
Comprises that part of the State of New York west of a line drawn north and south through the most easterly point of Altoona, Pennsylvania, and Erie County in that State.

9—**Detroit-Toledo District:**
Comprises the Counties of Seneca and Lucas in the State of Ohio and the Counties of Monroe, Lenawee, Jackson, Wayne, Oakland, Macomb and Washtenaw in the State of Michigan.

10—**South Ohio River District:**
Comprises the State of Kentucky, the City of Parkersburg, West Virginia, the cities along the Ohio River south of said City, the Counties of Guernsey, Muskingum, Jackson and Butler in the State of Ohio and the County of Wood in the State of West Virginia.

11—**Indiana-Illinois-St. Louis District:**
Comprises all the State of Indiana, except the County of Lake; all the State of Illinois, except the Counties of Lake and Du Page and the Chicago Switching District; the City of St. Louis and the County of St. Louis in the State of Missouri; and the County of Rock in the State of Wisconsin.

12—**Chicago District:**
Comprises the Chicago Switching District; the Counties of Lake and Du Page in the State of Illinois; the County of Lake in the State of Indiana; and the Counties of Kenosha, Racine and Milwaukee in the State of Wisconsin.

13—Southern District:
Comprises all that part of the United States south of the States of Maryland, West Virginia, Kentucky and Missouri, and the States of Texas and Oklahoma, but does not include the County of Jefferson in the State of Alabama.

14—Birmingham District:
Comprises the County of Jefferson in the State of Alabama.

15—Kansas City District:
Comprises the County of Jackson in the State of Missouri.

16—Duluth District:
Comprises the County of St. Louis in the State of Minnesota.

17—Colorado District:
Comprises the State of Colorado.

18—Utah District:
Comprises the State of Utah.

19—Seattle District:
Comprises the County of King in the State of Washington and the County of Multonomah in the State of Oregon.

20—San Francisco District:
Comprises the Counties of San Mateo, Alameda, Sacramento and Contra Costa in the State of California.

21—Los Angeles District:
Comprises the County of Los Angeles in the State of California.

SCHEDULE E

MINIMUM RATES OF PAY FOR COMMON LABOR.

	Cents per Hour
1—Eastern District	35
2—Johnstown District	37
3—Pittsburgh District	40
4—Youngstown Valley District	40
5—North Ohio River District	40
6—Canton, Massillon and Mansfield District	37
7—Cleveland District	40
8—Buffalo District	38
9—Detroit-Toledo District	40
10—South Ohio River District	37
11—Indiana - Illinois - St. Louis District	37
12—Chicago District	40
13—Southern District	25
14—Birmingham District	27
15—Kansas City District	35
16—Duluth District	37
17—Colorado District	40
18—Utah District	39
19—Seattle District	38
20—San Francisco District	37
21—Los Angeles District	35

SCHEDULE F

CONCERNING PRICES AND TERMS OF PAYMENT.

Section 1—Wherever used in the Code the terms hereinafter in this section 1 defined shall, unless the context shall otherwise clearly indicate, have the respective meanings hereinafter in this Section 1 set forth. The definition of any such term in the singular shall apply to the use of such term in the plural and vice versa.

(a) Until Schedule G of the Code shall have been amended as in Article XII of the Code provided, the term "basing point" for any product means one of the places listed in such Schedule G as a basing point for such product. Thereafter the term shall mean one of the places listed in such Schedule G as at the time in effect as a basing point for such product.

(b) The term "base price" of any product means the price for such product, f.o.b. a basing point, before any extras in respect of such product shall be added or any discounts for early payment or deductions shall be allowed or made.

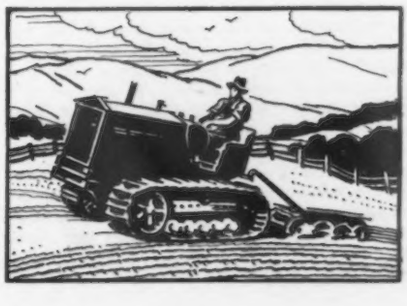
(c) The term "period of free credit" means the period of time between the date of a shipment of a product to the purchaser of such product and the date from and after which such purchaser shall be required to pay interest on the purchase price of such product or any part thereof which shall not have been paid prior to the expiration of such period.

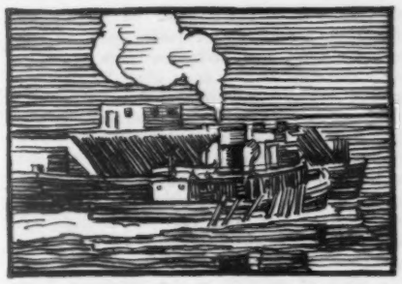
(d) The term "date of invoice" means the date of the invoice of any product.

(e) The term "discount for early payment" means the amount of the deduction allowed for the payment of an invoice of products before the expiration of the period of free credit in respect thereof.

(f) The term "an affiliated group" means one or more corporations connected through stock ownership with a common parent corporation, if (1) at least 75 per cent of the stock of each of such corporations (except such common parent corporation) is owned directly by one or more of the other corporations, and (2) such common parent corporation owns directly at least 75 per cent of the stock of at least one of the other corporations. The term "an affiliated company of a member of the Code" means (1) a corporation which is one of an affiliated group that also includes such member of the Code. or (2) in case the member of the Code is a person, firm or association, a corporation at least 75 per cent of the stock of which is owned by such member. For the purposes of this paragraph (f) the term "stock" does not include non-voting stock which is limited and preferred as to dividends.

Section 2.—Each member of the Code shall, within ten days after the effective date of the Code, file with the Secretary a list showing the base prices for all its products, and from and after the expiration of such ten days such member shall at all times maintain on file with the Secretary a list showing the base prices for all its products and shall not make any change in such base prices except as provided in this Schedule F. Each such list shall state the date upon which it shall become effective, which date shall be not less than ten days after the date of filing such list with the Secretary; **provided, however,** that the first list of base prices filed by any member of the Code as above provided shall take effect on the date of filing thereof. None of the base prices shown in any list filed by any member of the Code as herein provided shall be changed except by the filing by such member with the Secretary of a new list of its base prices, which shall become effective on the effective date therein specified which shall not be less than ten days after the date on which such new price list shall have been so filed. In the case of pipe of sizes or kinds which are sold on a list and discount basis, for the purposes of this Section 2 the list of base prices shall consist of a price list and one or more basing discount lists, from which the base prices of such pipe shall be determined; **provided, however,** that in the case of oil country tubular goods there shall be filed in lieu of a list of base prices a price list and one or more basing discount lists from which the delivered prices of such goods shall be determined.





Section 3.—Except as hereinafter otherwise provided in respect of Standard Tee Rails of 60 pounds per yard or heavier, the base price for any product shown in any list of base prices filed by a member of the Code in accordance with the provisions of the foregoing Section 2 shall be as follows: **(a)** If such member shall operate a plant for the production of such product which is located at a basing point for such product, f. o. b. such basing point, or **(b)** if such member shall operate a plant for the production of such product which is not located at a basing point for such product, f. o. b. the basing point for such product nearest in terms of all-rail freight rates to such plant, or **(c)**, if any Gulf or Pacific Coast port shall be listed as a basing point in Schedule G of the Code as at the time in effect, f. o. b. such port. Except as otherwise provided in this Schedule F, each member of the Code shall file with the Secretary and maintain on file with him a list showing the base price for each of its products for each basing point for such product at which a plant of such member for the manufacture of such product shall be located and for each basing point of such product which shall be nearest in terms of all-rail freight rates to any plant of such member for the manufacture of such product not located at a basing point for such product; and, if any Gulf or Pacific Coast port shall be listed as a basing point in such Schedule G, such member may show in such list its base price for any product at such basing point. All base prices shown in the list so filed shall constitute the published base prices of such member for the products and for the basing points shown in such list. Except as aforesaid, none of the members of the Code shall file any list of base prices showing any price for any of its products other than the base price for such product f. o. b. the basing point or basing points for such product as hereinbefore provided. The published base price of each such member for any product (except Standard Tee Rails of 60 pounds per yard or heavier) for any basing point for such product other than that or those shown in the list of base prices so filed by such member shall be deemed to be the lowest base price for such product at such other basing point which shall be shown in the list of base prices filed by any other member of the Code and then in effect. All base prices for Standard Tee Rails of 60 pounds per yard or heavier shall be f. o. b. the mill of the producer thereof, or, in the case of rails carried by water from any Atlantic Coast or Gulf port to any Gulf or Pacific Coast port, c.i.f. the port of destination. Lists of prices filed with the Secretary pursuant to the foregoing Section 2 and to this Section 3 shall be open to inspection at all reasonable times by anyone having an interest therein.

Section 4.—Except as otherwise provided in this Schedule F of the Code, all prices quoted and billed by any member of the Code for any product (except Standard Tee Rails of 60 pounds per yard or heavier and oil country

tubular goods, which shall be quoted and billed as hereinafter provided) sold by such member from and after ten days after the effective date of the Code shall be delivered prices, which (disregarding the extras, if any, required by, and the deductions, if any, that may be made pursuant to, the provisions of the Code) shall be not less than the sum of (a) the published base price of such member for such product effective at the time of the sale thereof and (b) the all-rail published tariff freight charges from the basing point on which such base price is based to the place of delivery to the purchaser thereof, or, if such place of delivery shall be at such basing point, the published tariff switching charges to such place of delivery from the plant of any member of the Code for the production of such product at such basing point nearest in terms of such switching charges to such place of delivery; **provided, however,** that (a) in any case in which such product shall be delivered by other than all-rail transportation, the member of the Code selling such product may allow to the purchaser a reduction in the delivered price otherwise chargeable under this Section 4 at a rate which shall have been previously approved by the Board of Directors and filed with the Secretary; and (b) in the case of plates, shapes or bars intended for fabrication for an identified structure, for the purpose of establishing the delivered price thereof, the place of delivery shall be deemed to be the freight station at or nearest to the place at which such structure is to be erected, and not the shop of the fabricator; and (c) subject as hereinafter in this Section 4 provided, if any list of prices filed with the Secretary by any member of the Code pursuant to this Schedule F and at the time in effect shall show a specified rate of deduction from the price of any product to be allowed by such member on any sale of such product to any jobber for resale, such member may, from and after the date on which such list shall have become effective, allow to any jobber to whom such member shall sell such product for resale a deduction from such price to such jobber for such product at a rate not greater than the rate so shown in such list; and **provided, further,** that the Board of Directors by the affirmative vote of three-fourths of the whole Board may permit any member of the Code in special instances or members of the Code generally to sell or contract for the sale of any product produced by such member or members at a base price which shall be less than the then published base price of such member or members for such product at the respective basing points therefor of such members, if by such vote such Board shall determine that the making of such sale or contract of sale at such less base price is in the interest of the Industry or of any other branch of industry and will not tend to defeat the policy of Title I of the National Industrial Recovery Act by making possible the using or employing of an unfair practice. The Board of Directors shall prescribe such rules and regulations as it shall deem proper by which the question of whether or not any purchaser or prospective purchaser of any product for resale is a jobber shall be determined, and in granting any permission as aforesaid, the Board of Directors shall prescribe such rules and regulations in respect thereof as in its judgment shall be necessary in order to insure to the members of the Code that action in accordance with any such permission shall not result in an unfair practice; and thereafter such Board may by like vote rescind any permission so granted or modify, cancel or add to any rules and regulations so prescribed. The Secretary shall send to each member of the Code a copy of all such rules and regulations prescribed by such Board with respect to the determination of the question

of whether a purchaser or prospective purchaser for resale is a jobber, and he shall give notice in writing of all action so taken by the Board of Directors to each member of the Code which at the time shall be engaged in producing the kind of product in respect of which any such permission was granted. Before any member of the Code shall allow any such deduction to any jobber or sell for resale to any purchaser who shall not be a jobber any product pursuant to any permission so granted to such member, such member shall secure from such jobber or such other purchaser an agreement substantially in a form theretofore approved by the Board of Directors and filed with the Secretary whereby such jobber or other purchaser shall agree with such member (a) that such jobber or other purchaser will not, without the approval of the Board of Directors, sell such product to any third party at a price which at the time of the sale thereof shall be less than the price at which such member might at that time sell such product to such third party, and (b) that, if such jobber or such other purchaser shall violate any such agreement, he shall pay to the Treasurer as an individual and not as treasurer of the Institute, in trust, as and for liquidated damages the sum of $10 per ton of any product sold by such jobber or such other purchaser in violation thereof. Except as aforesaid, all prices quoted and billed by any member of the Code for Standard Tee Rails of 60 pounds per yard or heavier sold by it from and after ten days after the effective date of the Code (disregarding extras and deductions as aforesaid) shall be not less than the published base price of such member for such rails effective at the time of the sale thereof f. o. b. mill of the producer, or, in the case of rails carried by water from any Atlantic Coast or Gulf port to any Gulf or Pacific Coast port, c.i.f. the port of destination. Except as aforesaid, all prices quoted and billed by any member of the Code for oil country tubular goods sold by it from and after ten days after the effective date of the Code (disregarding extras and deductions as aforesaid) shall be not less than the delivered price of such goods determined by deducting from the published list price of such member for such goods effective at the time of the sale thereof the published basing discounts applicable to such goods effective at such time. In case at the effective date of the Code any valid, firm contract to which a member of the Code shall be a party shall exist for a definite quantity of any product or for all or a substantial part of the requirements of the purchaser thereof (a) at a fixed price, or (b) at a price that can be definitely determined in accordance with the provisions of such contract, or (c) at the market price for such product at the date when a definite quantity thereof shall be specified under such contract and such contract covered a sale of 20 per cent or more of the total quantity of such product produced and sold in the United States in the calendar year 1932, it is recognized that such contract will tend to establish the market price for such product during the remainder of its life and that, if the other members of the Code which produce and sell such product shall by the foregoing provisions of this Schedule F be prevented from selling such product during the remainder of the life of such contract at as favorable a price and on as favorable terms and conditions as those provided for in such contract, then unfair competition as between the member of the Code which shall be a party to such contract and the other members thereof and also as between the other party to such contract and its competitors may result. Accordingly, anything herein to the contrary notwithstanding, during the remainder of the life of such contract any member of the Code may sell such product at a price and on terms and conditions as favorable as (but not more favorable than) the price, terms and conditions provided for in such contract.

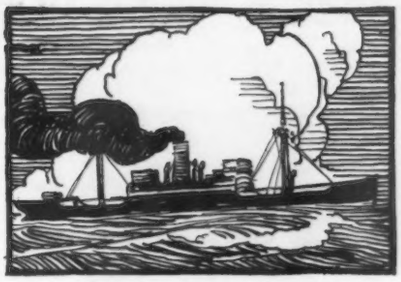
Section 5.—The Board of Directors shall have power on its own initiative, or on the complaint of any member of the Code, to investigate any base price for any product at any basing point shown in any list filed with the Secretary by any member of the Code, and for the purpose of the investigation thereof to require such member to furnish such information concerning the cost of manufacturing such product as the Board of Directors shall deem necessary or proper for such purpose. If the Board of Directors after such investigation shall determine that such base price is an unfair base price for such product at such basing point, having regard to the cost of manufacturing such product, and that the maintenance of such unfair base price may result in unfair competition in the Industry, the Board of Directors may require the member of the Code that filed the list in which such unfair base price is shown to file a new list showing a fair base price for such product at such basing point, which fair base price shall become effective immediately upon the filing of such list. If such member of the Code shall not within ten days after notice to it of such determination by the Board of Directors file a new list showing such fair base price for such product at such basing point, the Board of Directors shall have power to fix a fair base price for such product at such basing point, which fair base price, however, shall not be more than the base price of any other member of the Code at that time effective for such product at such basing point and in respect of which the Board of Directors shall not theretofore have begun an investigation or a complaint shall not have been made by any member of the Code. When the decision of such Board fixing such fair base price shall have been filed with the Secretary and the Secretary shall have given notice thereof to such member, such fair base price shall be the base price of such member for such product at such basing point, until it shall have been changed as in the Code provided. A notice of all decisions of the Board of Directors under this Section 5, together with the reasons therefor, shall be filed with the President.

Section 6.—Except as in this Schedule F of the Code otherwise provided, the maximum rates of discount for early payment and the maximum periods of free credit which may be allowed by any member of the Code shall be the rates and periods specified in Schedule H of the Code, unless and until such rates or such periods shall be changed by the Board of Directors by the affirmative vote of two-thirds of the whole Board and embodied in a new Schedule H filed with the Secretary. Except as aforesaid, all invoices for products sold by any member of the Code after the effective date of the Code shall bear interest from and after the expiration of the period of free credit at a rate which shall be not less than the then current rate established by the Board of Di-

rectors and filed with the Secretary. Nothing in the Code contained shall prevent any member of the Code from allowing credit to any purchaser or allowing any purchaser to delay payment in respect of any invoice for a longer period than the maximum period of free credit specified in such Schedule H; but, if any member of the Code shall allow credit to any purchaser or allow any purchaser to delay payment in respect of any invoice for a period longer than such maximum period of free credit, then such member shall charge and collect interest on the amount in respect of which credit shall be so allowed or the payment of which shall have been so delayed at a rate not less than the current rate established and filed as aforesaid.

Section 7.—Except as in this Schedule F of the Code otherwise provided, any extras added to, and any deductions made from, the base price for any product sold by any member of the Code in determining its quoted or billed price for such product shall be uniform for all members of the Code. The rates of such extras and of such deductions shall be those approved from time to time by the Board of Directors as being in accordance with the trade practice customary in the Industry at the effective date of the Code and as meeting the requirements of the Code and filed with the Secretary. In case any member of the Code shall sell any product to which any such rate of extra or deduction shall apply, except as aforesaid such member shall add an extra at a rate which shall not be less than the rate of extra applicable to such product theretofore approved by the Board of Directors as aforesaid and at the time in effect and none of the members of the Code shall make any deduction at a rate that shall be more favorable to the purchaser of such product than the rate of deduction applicable to such product theretofore approved by the Board of Directors as aforesaid and at the time in effect; **provided, however,** that nothing in the Code contained shall be so construed as to prevent any member of the Code from selling or contracting to sell any product for use by the purchaser thereof in the manufacture of articles for shipment in export trade within the meaning of the term "export trade" as it is used in the Export Trade Act under an agreement by such member of the Code with such purchaser that, when such articles shall have been shipped in such export trade, such member of the Code shall make an allowance at a rate approved by the Board of Directors and a statement of the approval of which shall theretofore have been filed with the Secretary, which rate in the opinion of such Board shall be sufficient to enable such member of the Code or such purchaser to meet foreign competition in the sale and delivery of such product or such articles, as the case may be.

Section 8.—The practice of shipping products on consignment may result in unfair competition and it is the intention of the Industry to eliminate such practice as soon as possible after the effective date of the Code. Accordingly, except to the extent necessary to carry out arrangements existing on the effective date of the Code and which shall have been reported to the Board of Directors, from and after such date none of the members of the Code shall deliver products, other than pipe, on consignment except to an affiliated company of such member. All arrangements for the delivery by any member of the Code of products on consignment (other than consignments to an affiliated company of such member and other than consignments of pipe) existing on the effective date of the Code shall be terminated on or before June 30, 1934, and all stock held on consignment on that date shall either be sold to the consignee or possession thereof shall be taken by the consignor. The Board of Directors shall in-



vestigate problems presented in the elimination of consigned stocks of pipe and shall recommend to the members of the Code which shall be parties to then existing arrangements with respect to shipments of pipe on consignment (other than consignments from a member of the Code to an affiliated company) such action in respect thereof as such Board shall deem proper and designed to accomplish the termination of all such arrangements (other than as aforesaid) at as early a date as possible.

Section 9.—For all purposes of this Schedule F, a delivery of any product made pursuant to a contract of sales shall be regarded as a sale thereof made at the time of the making of such contract. Except in the case of a product required by a purchaser for a specified definite contract of such purchaser with a third party at a fixed price, none of the members of the Code shall make any contract of sale of any product by the terms of which the shipment of such product is not required to be completed before the end of the calendar quarter-year ending not more than four months after the date of the making of such contract.

Section 10.—Nothing in the Code contained, however, shall be so construed as to prevent the performance by any member of the Code of a valid, firm contract existing and to which it is a party at the effective date of the Code for a definite quantity of any product or for all or a substantial part of the requirements of the purchaser thereof **(a)** at a fixed price, or **(b)** at a price that can be definitely determined in accordance with the provisions of such contract, or **(c)** at the market price for such product at the date when a definite quantity thereof shall be specified under such contract. If any member of the Code shall at the effective date thereof be a party to any contract for the sale of any product by such member which by its terms is to continue after December 31, 1933, and by its terms the price to be paid for such product by the other party to such contract is related to the market price thereof at the date when a definite quantity thereof may be specified under such contract and may be less than such market price, then such member shall within thirty days after the effective date of the Code file a copy of such contract with the Secretary in order that the Board of Directors may consider it and take such action in respect thereof consistent with the rights and obligations of the parties to such contract as such Board shall deem proper.

Section 11.—A sale made by any member of the Code indirectly through any affiliated company of such member shall be deemed to be a sale made by such member.

Section 12.—Nothing in the Code contained shall be deemed to apply to or affect the sale of any product for direct shipment in export trade by any member of the Code within the meaning of the term "export trade" as it is used in the Export Trade Act or, unless and to the extent that the Board of Directors shall otherwise determine, the sale of any product by any such member for direct shipment to the Philippines, Hawaii or Porto Rico or other insular possessions of the United States of America.

SCHEDULE G

LIST OF BASING POINTS.

The places hereinafter in this Schedule G listed are the basing points for the respective products named.

Bale Ties:

Pittsburgh, Pa.	Duluth, Minn.
Cleveland, O.	Gulf Ports*
Chicago, Ill.	Pacific Coast Ports**
Birmingham, Ala.	

Bars—Alloy Steel, Hot Rolled:

Pittsburgh, Pa.	Canton, O.
Buffalo, N. Y.	Massillon, O.
Chicago, Ill.	Bethlehem, Pa.

Bars—Cold Finished, Carbon and Alloy:

Pittsburgh, Pa.	Chicago, Ill.
Buffalo, N. Y.	Gary, Ind.
Cleveland, O.	

Bars—Concrete Reinforcing:

Pittsburgh, Pa.	
Buffalo, N. Y.	Birmingham, Ala.
Cleveland, O.	Youngstown, O.
Chicago, Ill.	Gulf Ports
Gary, Ind.	Pacific Coast Ports

* Except as otherwise shown in this Schedule G, the Gulf Ports are Mobile, Ala.; New Orleans, La.; and Orange, Port Arthur, Beaumont, Baytown, Galveston and Houston, Tex.

** The Pacific Coast ports are San Pedro and San Francisco, Cal.; Portland, Ore.; and Seattle, Wash.; and San Diego, Cal., for Plates and Structural Shapes.

Bars—Iron:

Pittsburgh, Pa.	Reading, Pa.
Troy, N. Y.	Danville, Pa.
Jersey City, N. J.	Burnham, Pa.
Dover, N. J.	Creighton, Pa.
Philadelphia, Pa.	Richmond, Va.
Columbia, Pa.	Louisville, Ky.
Lebanon, Pa.	Terre Haute, Ind.

Bars—Merchant Steel:

Pittsburgh, Pa.	Gary, Ind.
Buffalo, N. Y.	Birmingham, Ala.
Cleveland, O.	Gulf Ports
Chicago, Ill.	Pacific Coast Ports

Bars—Tool Steel:

Pittsburgh, Pa.	Bethlehem, Pa.
Syracuse, N. Y.	

Girder Rails:

Lorain, O.	Steelton, Pa.

Ingots, Blooms, Billets and Slabs:

Pittsburgh, Pa.	Gary, Ind.
Buffalo, N. Y.	Birmingham, Ala.
Cleveland, O.	Youngstown, O.
Chicago, Ill.	

Light Rails—Less Than 60 Lbs. Per Yard:

Pittsburgh, Pa.	Birmingham, Ala.
Chicago, Ill.	

Mechanical Tubing:

Pittsburgh, Pa.	Detroit, Mich.
Canton, O.	Milwaukee, Wis.
Shelby, O.	

Pig Iron—Foundry, Malleable, Open Hearth Basic and Bessemer:

Buffalo, N. Y.	Hamilton, O.
Cleveland, O.	Toledo, O.
Chicago, Ill.	Granite City, Ill.
Birmingham, Ala.	Detroit, Mich.
Youngstown, O.	Duluth, Minn. (except open hearth basic)
Neville Is., Pa.	
Sharpsville, Pa.	Provo, Utah
Erie, Pa.	Everett, Mass.
Bethlehem, Pa.	Sparrows Point, Md.
Swedeland, Pa.	
Birdsboro, Pa.	

Pipe—Rigid Electrical Conduit:

Pittsburgh, Pa.	Evanston, Ill.

Pipe—Standard, Line Pipe and Oil Country Tubular Products:

Pittsburgh, Pa.	Lorain, O.
Gary, Ind.	

Plates:

Pittsburgh, Pa.	Coatesville, Pa.
Chicago, Ill.	Sparrows Point, Md.
Gary, Ind.	Gulf Ports
Birmingham, Ala.	Pacific Coast Ports

Railroad Angle Bars:

Pittsburgh, Pa.	Birmingham, Ala.
Buffalo, N. Y.	Steelton, Pa.
Chicago, Ill.	Pueblo, Colo.

Railroad Tie Plates:

Pittsburgh, Pa.	Pueblo, Colo.
Buffalo, N. Y.	Weirton, W. Va.
Chicago, Ill.	Portsmouth, O.
Birmingham, Ala.	Steelton, Pa.
St. Louis, Mo.	Pacific Coast Ports
Kansas City, Mo.	

Railroad Track Spikes:

Pittsburgh, Pa.	Kansas City, Mo.
Buffalo, N. Y.	Pueblo, Colo.
Cleveland, O.	Philadelphia, Pa.
Chicago, Ill.	Lebanon, Pa.
Birmingham, Ala.	Columbia, Pa.
Youngstown, O.	Richmond, Va.
Portsmouth, O.	Jersey City, N. J.
Weirton, W. Va.	Pacific Coast Ports
St. Louis, Mo.	

Sheet Bars:

Pittsburgh, Pa.	Youngstown, O.
Buffalo, N. Y.	Canton, O.
Cleveland, O.	Sparrows Point, Md.
Chicago, Ill.	

Sheets:

Pittsburgh, Pa.	Birmingham, Ala.
Gary, Ind.	Pacific Coast Ports

Skelp:

Pittsburgh, Pa.	Youngstown, O.
Buffalo, N. Y.	Coatesville, Pa.
Chicago, Ill.	Sparrows Point, Md.

Steel Sheet Piling:

Pittsburgh, Pa.	Gulf Ports
Buffalo, N. Y.	Pacific Coast Ports
Chicago, Ill.	

Strip Steel—Cold-Rolled:

Pittsburgh, Pa.	Worcester, Mass.
Cleveland, O.	

Strip Steel—Hot-Rolled:

Pittsburgh, Pa.	Chicago, Ill.

Structural Shapes:

Pittsburgh, Pa.	Bethlehem, Pa.
Buffalo, N. Y.	Gulf Ports
Chicago, Ill.	Pacific Coast Ports
Birmingham, Ala. (standard shapes only)	

Tin Plate, Tin Mill Black Plate and Terne Plate:

Pittsburgh, Pa.	Pacific Coast Ports
Gary, Ind.	

Tube Rounds:

Pittsburgh, Pa.	Chicago, Ill.
Buffalo, N. Y.	Birmingham, Ala.
Cleveland, O.	

Wire—Drawn, except as hereinafter specified:

Pittsburgh, Pa.	Worcester, Mass.
Cleveland, O.	Gulf Ports:
Chicago, Ill.	New Orleans, La.
Birmingham, Ala.	Galveston, Tex.
Anderson, Ind.	Houston, Tex.
Duluth, Minn.	Pacific Coast Ports

Wire Nails and Staples, Barbed Wire and Wire Fencing:

Pittsburgh, Pa.	Anderson, Ind.
Cleveland, O.	Duluth, Minn.
Chicago, Ill.	Gulf Ports
Birmingham, Ala.	Pacific Coast Ports

Wire Rods:

Pittsburgh, Pa.	Chicago, Ill.
Cleveland, O.	Birmingham, Ala.

Wire—Spring:

Pittsburgh, Pa.	Worcester, Mass.
Cleveland, O.	Pacific Coast Ports
Chicago, Ill.	

Wire—Telephone:

Pittsburgh, Pa.	Trenton, N. J.
Cleveland, O.	Worcester, Mass.
Chicago, Ill.	Sparrows Point, Md.
Muncie, Ind.	Pacific Coast Ports

SCHEDULE H

MAXIMUM RATES OF DISCOUNT FOR EARLY PAYMENT AND MAXIMUM PERIODS OF FREE CREDIT

Maximum Rates of Discount for Early Payment:

In the case of products shipped from plants located east of the Mississippi River to Pacific Coast ports and which shall be invoiced from such plants—½ of 1 per cent, if the invoice of such products shall be paid within 25 days from the date of such invoice; in all other cases—½ of 1 per cent, if the invoice of such products shall be paid within 10 days from the date of such invoice; **provided, however,** in the latter cases, that any member of the Code may allow such discount of ½ of 1 per cent for payment within 10 days on the basis of settlements three times in each month, as follows:

(1) On invoices for products dated from the 1st to the 10th, inclusive, in any month, such discount may be allowed on payment of such invoices on or before the 20th of such month;

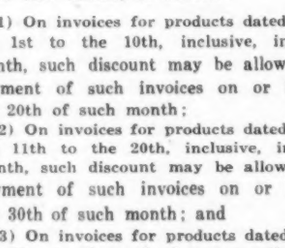
(2) On invoices for products dated from the 11th to the 20th, inclusive, in any month, such discount may be allowed on payment of such invoices on or before the 30th of such month; and

(3) On invoices for products dated from the 21st to the end of any month, such discount may be allowed on payment of such invoices on or before the 10th of the next following month.

Any discount allowed in accordance with the provisions of this Schedule H shall apply only to the invoiced value of the products specified therein and not to any part of the transportation charges on such products.

Maximum Periods of Free Credit:

In the case of products shipped from plants located east of the Mississippi River to Pacific Coast ports and which shall be invoiced from such plants—45 days; in all other cases—30 days.



SCHEDULE I

LIST OF UNFAIR PRACTICES.

For all purposes of the Code the following described acts shall constitute unfair practices:

A.—Making or promising to any purchaser or prospective purchaser of any product, or to any officer, employee, agent or representative of any such purchaser or prospective purchaser, any bribe, gratuity, gift or other payment or remuneration, directly or indirectly.

B.—Procuring, otherwise than with the consent of any member of the Code, any information concerning the business of such member which is properly regarded by it as a trade secret or confidential within its organization, other than information relating to a violation of any provision of the Code.

C.—Imitating or simulating any design, style, mark or brand used by any other member of the Code.

D.—Using or substituting any material superior in quality to that specified by the purchaser of any product or using or substituting any material or any method of manufacture not in accord with any applicable law, rule or regulation of any governmental authority.

E.—Cancelling in whole or in part, or permitting the cancellation in whole or in part of, any contract of sale of any product, except for a fair consideration, or paying or allowing to any purchaser in connection with the sale of any product any rebate, commission, credit, discount, adjustment or similar concession other than as is permitted by the Code and specified in the contract of sale.

F.—Disseminating, publishing or circulating any false or misleading information relative to any product or price for any product of any member of the Code, or the credit standing or ability of any member thereof to perform any work or manufacture or produce any product, or to the conditions of employment among the employees of any member thereof.

G.—Inducing or attempting to induce by any means any party to a contract with a member of the Code to violate such contract.

H.—Aiding or abetting any person, firm, association or corporation in any unfair practice.

I.—Making or giving to any purchaser of any product any guaranty or protection in any form against decline in the market price of such product.

J.—Stating in the invoice of any product as the date thereof a date later than the date of the shipment of such product, or including in any invoice any product shipped on a date earlier than the date of such invoice.

K.—Making any sale or contract of sale of any product under any description which does not fully describe such product in terms customarily used in the Industry.

L.—Rendering to any purchaser of any product in or in connection with the sale of such product any service, unless fair compensation for such service shall be paid by such purchaser.

M.—Any violation of any other provision of the Code, whether or not therein expressed to be such, or using or employing any practice not hereinabove in this Schedule I described which the Board of Directors by the affirmative vote of three-fourths of the whole Board shall have declared to be a practice that would tend to defeat the policy of Title I of the National Industrial Recovery Act and, therefore, an unfair practice, and of which determination by such Board the Secretary shall have given notice to the members of the Code and to the President.

OBITUARY

WILLIAM L. WARD, president of the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., died of pneumonia in Mount Sinai Hospital in New York on July 16 after an operation. He was born on Sept. 2, 1856, at Greenwich, Conn., and received his schooling at the Friends' Seminary in New York and at the School of Mines of Columbia University, class of 1878. His education included learning the machinist's trade and he prided himself that he could "turn out nuts and bolts of the most unusual specifications." Early in his career Mr. Ward became identified with the Russell, Burdsall & Ward Bolt & Nut Co., of which his father was president. Later he started his own nut and bolt business with the late Samuel Comly as partner. His company was merged with his father's firm in 1902 and he was made president of the new organization, which he headed until his death. Although he was widely and best known for his long and active career in politics, he was a designer of marked ability, having designed much of the machinery used in the company's plants. Mr. Ward was untiring in his efforts on behalf of Westchester, and the development of the county's social agencies, park and recreation systems evidenced his desire to make Westchester County "a happier and better place in which to live."

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ALEXANDER CHURCHWARD, since 1921 engineer for the Wilson Welder & Metals Co., Inc., North Bergen, N. J., died after a brief illness at his home in South Orange, N. J., on July 12, aged 60 years. Throughout his entire career Mr. Churchward was engaged in electric research and development work. He came to the United States from England at the age of 18 and started work as an electrician. He associated himself with the research department of the General Electric Co. in 1900. Five years later he engaged in consulting engineering work and in this capacity come in contact with Henry Ford and Thomas A. Edison. During the World War he did electrical research work for the Shipping Board, and in 1918 went to Detroit to develop a self-starter for the Ford car. He became identified with the Wilson Welder company in 1921.

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WILLIAM ACHESON SMITH, president of the Acheson Graphite Corpn., and vice-president of the National Carbon Co., died at Johns Hopkins Hospital on July 12, aged 54 years. After his graduation from the University of Pittsburgh in 1900 he became identified with the Niagara Falls plant of the Acheson company, of which he was made president 15 years later. Mr. Smith was a past-president of the Electrochemical Society and a member of the American Institute of Mining and Metallurgical Engineers.

WILLIAM L. WARD

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J. ALEX QUAY, who has been associated for the past 16 years with the Union Drawn Steel Co., Massillon, Ohio, died on July 11, aged 40 years. Mr. Quay was first identified with the company as purchasing agent and later as manager of sales promotion.

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FRANK E. RICHARDSON, president of the Pittsburgh Forge & Iron Co., Pittsburgh, died at his home in Sewickley, Pa., on July 10. He was born in Pittsburgh in 1861 and had been identified with the Forge & Iron company since 1879. He became secretary in 1891, and was made president in 1909.

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BOLLING H. JONES, chairman of the board of the Birmingham Stove & Range Co., died on July 13. Mr. Jones had been connected with stove manufacturing in the South since 1901, when he went to Atlanta to join his brother, the late Samuel D. Jones, in the Atlanta Stove Works, as vice-president. Later he and his associates organized the Birmingham Stove & Range Co. For a number of years Mr. Jones served as president and later became chairman of the board.

ALEXANDER CHURCHWARD

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CLIFTON D. PETTIS, former vice-president of the American Brake Shoe & Foundry Co., died July 9, aged 63 years. He was an organizer of the National Brake Shoe Co. and joined the American Brake Shoe & Foundry Co. in 1910 as vice-president. He resigned that position in 1928 to enter a similar business with his son.

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C. T. MAYFIELD, with the Tennessee Coal, Iron & Railroad Co., Birmingham, for over 30 years and assistant traffic manager since 1916, died July 2 of heart disease.

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LOUIS C. HIRSHHEIMER, president, L. C. Hirshheimer, Inc., manufacturer of gray iron castings at LaCrosse, Wis., died June 29 from a heart attack. He was 54 years of age and a native of LaCrosse. Following graduation from the University of Wisconsin and Cornell University, he became foundry manager, LaCrosse Plow Co., continuing until 1926 when he organized his own business, meanwhile serving as designer and builder of several large foundries in the Middle West, notably that of the General American Tank Car Corpn., at Chicago. Mr. Hirshheimer was a member of the American Society of Mechanical Engineers.

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ROBERT T. MCCOY, of Cincinnati, editor of the *International Moulders' Journal of North America*, died on July 3 at his home. Mr. McCoy was born in Murfeesboro, Tenn., and received his education there. Later he went to Pittsburgh and was agent for the molders' union of the Pennsylvania district for many years. He moved to Cincinnati six years ago and for the past three years had been editor of the union publication. He was 61 years old.

Bethlehem Advances Wages 15 Per Cent.

After meeting held July 17 of the various groups of employees' representatives throughout the company, the Bethlehem Steel Co. announced a 15 per cent general increase in wages, effective July 16.

More than 1,250,000 tons of merchant vessels, under all flags, were scrapped or condemned during 1932, according to the Transportation Division, Commerce Department.

Steel Companies Raise Wages

PITTSBURGH, July 18.—The subdiary companies of the United States Steel Corpn. and leading independents have advanced wages in the Pittsburgh, Youngstown and Wheeling districts to a minimum of 40c. an hour for common labor. At the same time higher rates have been moved up 15 per cent, all changes to be effective July 16. Advances for salaried workers have not yet been made generally, but several companies have initiated increases of 15 per cent over recent minimum figures. These changes are in line with the proposed code of operation which has been submitted to the National Industrial Recovery Administration by the American Iron and Steel Institute.

Reaction to the other labor provisions of the proposed code are generally favorable in this district. Prescribing of a maximum work week of 40 hours might lead to certain disadvantages in times of large seasonal demand for such products as tin plate, but a provision allowing the 40-hr. maximum week to be averaged over a six-months' period would eliminate most of these difficulties. This latter feature of the code provides the flexibility so largely needed in the industry, and steel company executives are particularly anxious that it be incorporated in the final code.

The commercial features of the proposed code are satisfactory to local steel producers, particularly in the establishment of a minimum base price to all consumers. Present quotations are understood to apply for the time being after the code is approved at Washington, and advanced quotations may be filed at any time to take effect within ten days. Penalties to be exacted upon proof of sales at lower levels than those filed by individual companies are believed to be sufficiently severe to eliminate all price cutting. Nevertheless, it is emphasized that there is nothing in the code which might prevent a producer with low costs from filing slightly lower selling prices than those of his competitors if such quotations can be publicly justified to the Administration. This will tend to relieve any accusation of price fixing, and at the same time may gain a stable market.

American Shipyards on Pauper Tonnage Basis

American shipyards are building less than one half of one per cent of the total tonnage of merchant vessels of 100 tons gross and upwards being constructed throughout the world at the present time, says a statement just issued by Lloyd's Register of Shipping, covering returns for the quarter ended June 30 last, from all maritime countries except Russia, for which figures have not been available for some time.

With only about 3000 gross tons of merchant ships now in hand, American yards have less than a tenth of the volume of production under way three months ago. At this time last year, the United States was building 162,203 gross tons.

The decline of 28,000 tons in American production during the last quarter compares with a gain of 35,000 tons for Great Britain and Ireland, and of 26,000 tons for Japan. Denmark showed an advance of about 7000 tons. Italy, however, had a decrease of 32,000 tons, and has less than half her volume of construction under way at the end of March. The other countries reported small declines in output. For all countries taken together, however, the quarter showed a decline of about 8000 tons. The present world total is the smallest of any in recent years.

How the volume of merchant shipbuilding has compared during the last two quarters in Great Britain and Ireland, the United States, and the other countries taken as a group, is shown in the following table, the figures representing gross tons:

	June 30, 1933	March 31, 1933
Great Britain and Ireland	287,502	252,401
United States	3,038	31,128
Other countries	441,955	457,415
World total	732,495	740,944

Last Minute Sales Leads

(Received too late for classification in our Plant Expansion Section)

Hiram Walker & Sons, Inc., Union Guardian Building, Detroit, recently organized under State laws as a subsidiary of Hiram Walker-Gooderham & Worts, Ltd., Walkerville, Ont., distiller, has acquired 15-acre tract at Peoria, Ill., formerly used by Great Western Distillery, and plans erection of group of multi-story units, with power house, machine shop and other mechanical structures. Cost about $1,000,000 with equipment. William J. Hume, president and general manager of parent company, will be president of new organization.

City Council, Hayward, Cal., plans new municipal electric light and power plant. Cost about $240,000 with equipment. Edward K. Hussey, Syndicate Building, Oakland, Cal., is consulting engineer.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until July 26 for socket wrenches, steel disk wheels, 3000 lb. castings, 22 axle mounts, 22 sets brake equipment, 22 sets brakes, and other automotive equipment (Circular 4).

Crystal Springs Brewing Co., Cleveland, care of F. J. Hronek, 3763 East 126th Street, architect, now being organized by local interests, plans new brew-house, bottling works, storage and distributing building and other units at 5208 Harvard Avenue. Cost over $150,000 with equipment.

Shamrock Oil & Gas Co., Amarillo, Tex., plans expansion and improvements in plants in Panhandle district, including new gasoline extraction plant near Dumas, Tex., with capacity for handling 60,000,000 cu. ft. of gas daily, installation of new pressure unit and auxiliary equipment in gasoline extraction plant near Lefors, and new oil refinery in last noted district. Cost over $200,000 with machinery. John Sheerin is president.

New Prague Brewing Co., New Prague, Minn., plans extensions and improvements, including three-story addition, 42 x 60 ft. Cost over $85,000 with equipment. Max O. Buetow, 1380 Blair Street, St. Paul, Minn., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 25 for one electric motor-driven reversible vertical conveyor (Schedule 375) for Mare Island Navy Yard.

Massillon Rivet & Mfg. Co., Massillon, Ohio, manufacturers of rivets, bolts, studs, etc., is acquiring site near Detroit, fronting on Detroit, Toledo & Ironton Railroad, and plans new works. Present plant will be removed to new location.

Richmond Brewing Co., Richmond, Ind., recently organized, capital $250,000, by Philip Stapp, Richmond, and John F. Gubbins, Muncie, Ind., has acquired four-story industrial building and will remodel for plant with capacity of about 13,000 bbl. a month. Cost about $200,000 with machinery.

Barry Tank & Welding Co., Ltd., 4027 Beaconsfield Street, Montreal, A. M. Barry, head, plans one-story works for manufacture of aluminum and steel tanks, and kindred equipment.

City Council, Two Rivers, Wis., E. J. Donnelly, city manager, plans new municipal electric light and power plant. Cost $240,000 with equipment. Financing will soon be arranged. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Advance Machine Co., 2700 Franklin Street, Detroit, recently taken over by J. G. Alber, A. A. Amlinger and A. P. Dowell, will be operated under name of Advance Products Co.

PERSONALS

JOHN P. FERRIS, formerly chief engineer, Oilgear Co., Milwaukee, but for the past two years engaged in special work for the State of Wisconsin, has been appointed by DAVID LILLIENTHAL, member of the Tennessee Valley Commission, to make a study of prospects for proposed decentralization of industry in that region. Mr. Lillienthal was until recently a member of the State Public Service Commission of Wisconsin, resigning to accept appointment to the Tennessee Valley Commission.

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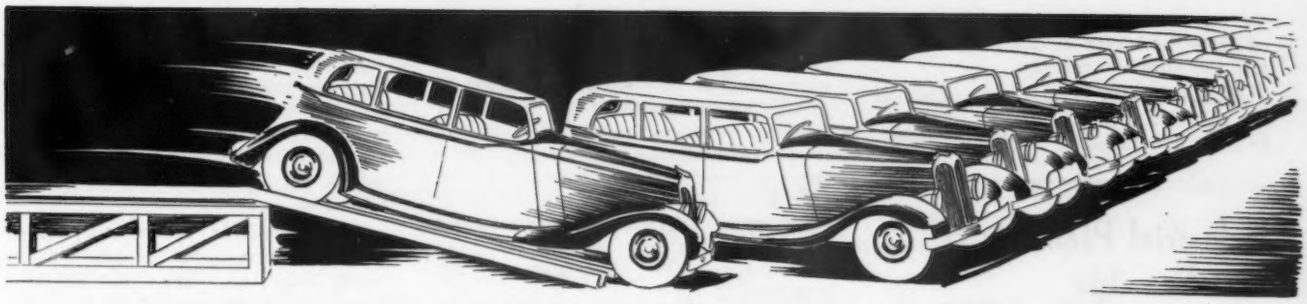
SEWELL L. AVERY, president of Montgomery Ward & Co. and of the United States Gypsum Co., has been made a director of Pullman, Inc.

Metropolitan Water District, Los Angeles, has taken bids on 300 tons of hollow drill steel for the Colorado River aqueduct; delivery over three years.



▲▲▲ THIS WEEK ON THE ASSEMBLY LINE ▲▲▲

Continuing Sales Keep Motor Car Builders Busy

DETROIT, July 18.

OPERATIONS of parts suppliers indicate that July production of the motor car companies will compare favorably with that of June, in which month total output exceeded 250,000 units. Several of the leading accessory companies report that their July sales to date are running in excess of corresponding period in June.

The automobile companies themselves began the month with schedules approximately the same as the initial programs for June. In a number of instances advances were made during the month so that the final June output was considerably greater than was indicated earlier. It is not unlikely that July will witness a similar stepping up as the month advances.

Retail sales are holding up surprisingly well and dealer orders do not presage any slowing down. Sales reports for the first 10 days of July will give some clue as to whether or not it will be necessary to step up the production rate. The first sales reporting period of the month, however, will not be an accurate gage of summer retail activity since it embraced the long Fourth of July week-end when many prospective automobile buyers were absent from their homes. Moreover many sales were crowded into the days immediately preceding the holiday week-end with a resultant adverse effect on sales for several days thereafter. Sales executives are anxiously waiting for the returns for the second 10-day period which will furnish a more reliable indication of what the summer trend will be.

Some manufacturers have been prevented from operating at higher levels by shortage of materials. The unexpectedly high production rate of the spring and summer to date has depleted inventories much sooner than was anticipated with the result that purchasing agents are hard pressed to supply the requirements of production departments. To protect themselves against rising prices many are ready to make long term commitments but they are finding few suppliers willing to take on such contracts in view of the uncertain price situation.

Car Prices May Rise

AUTOMOBILE manufacturers, who earlier this year had hoped to maintain present prices on the current run of models, are now not so sure that this can be done. Since it is necessary for many to replenish their inventories with higher priced materials, some observers in the industry are looking for higher car prices this fall.

Chevrolet Motor Co. is operating on a production schedule of 70,000 cars, the same as the initial June schedule. Several advances were made in the course of the past month, however, which brought the final output for June to 81,573 cars and trucks.

Production and shipments of Plymouth Motor Corpn. up to July 14 exceeded the entire output for 1932 by 15,682 cars, an increase of 13.3 per cent.

Ford Motor Co. reports that sales are still on the increase. June was the biggest month in 8-cylinder car sales since the company began producing them over a year ago.

Hudson Motor Car Co. began the month with a schedule of 6300 cars. The week ended July 8 was the ninth successive seven-day period in which sales for this company exceeded those of corresponding weeks of 1932. The last two weeks have shown big gains over the last year with week ended July 15. having a 144.6 per cent increase, and week ended July 8 a 201.8 per cent increase. To date July is running about 10 per cent ahead of June.

Good Progress in High Price Field

Business in the so-called higher priced field is making excellent progress in the opinion of M. M. Gilman, vice-president of distribution of Packard Motor Car Co. "Among cars selling for $2,000 or more, there have been decided gains in the last three months," he said. "While sales in June normally are from 15 to 20 per cent below those of May our deliveries this year continued at the same high level of May. Sales growth has been consistently accelerating since April.

"What the rest of July and the month of August will bring in the way of sales we do not, of course, know. We have high hopes, however, that gains in business will continue steadily through the rest of the year. These hopes are based on indications rather tangible in nature. In our own case we know that a pent-up demand for our product exists. A survey made in the spring, when conditions were less favorable than they are now, clearly indicated this."

SALES of Cadillac Motor Car Co. during the first 10 days of July were 21 per cent greater than for the like period in July last year, and orders on hand are substantially ahead of a year ago. Cadillac's stocks continue low.

Buick, Olds and Pontiac are working on schedules approximately the same as those of June. Dealers continue to order cars in good volume. A shortage exists on certain models.

No material change in the operations of these divisions is anticipated during the summer months.

Graham-Paige is operating at about the same rate as in June and expects to ship around 1200 cars this month.

Industrial Planning Is Not Feasible

(*Concluded from Page 26D*)

volume of industrial production and general trade, which has proceeded at an almost unvarying rate of growth since the beginning of the nation.

This depression, like all others in our history, has had almost nothing to do with the productive and business system of this country. It has been fundamentally the result of defects in the control of the basic factor in our whole economic life, which is the standard of value, the medium of exchange, and the volume of money and credit in use. The recovery, when it comes, will come because of factors which affect the general price level and the value of money and not as a result of any influences involved in the productive industry and trade of the nation.

Efforts to interfere in the industrial and trade mechanism of the nation by detailed administration of prices, costs, and production, and investment can only delay, confuse, and obstruct recovery; but it cannot prevent such recovery ultimately. After business recovers from the depression it may still be necessary for it to recover from the cure.

The second important observation to be made about these underlying ideas involved in the Administration's present policies is that the attempt of Governmental employees to plan and control the economic life of the nation is being undertaken with almost complete lack of preparation by way of any adequate body of statistical facts upon which to base any plans or controls. No matter how able the men who are attempting this task may be, even assuming that they are intellectual giants without equal in the world's history, the plain truth is that they have no equipment with which to proceed to the task except this general ideology and these broad theories which I have described.

The factual data regarding industrial and business operations in the United States which have been available up to this moment have been inadequate even to enable small groups of industrial concerns in single industries to determine their course of conduct with any assurance of safety. Certainly, the facts available for industry, trade, and finance as a whole have been insufficient to enable even the experts who are now attempting to plan the future of American business to forecast with any certainty or definiteness either the decline in prices and production in 1929 or the upturns this year. The assembling, interpretation and organization of information essential to intelligent operation of the individual business concerns or single industries in this country has barely begun. How can any honest or sensible person pretend that there exists today any basis upon which any group of men in the United States can proceed to plan and control the industries of the country?

These facts alone are a sufficiently significant indication of the state of mind of those whom the revolution of 1933 has raised to a position of responsibility and power, who are responsible for these projects of planning and control and who have undertaken to administer them. American industry in the past has been ruled, internally so far as it has been ruled at all, by its own ignorance and indifference. Now, by reason of default, it is being governed from the outside by doctrines, dogmas, and ideologies which have no scientific basis whatever, but are merely the personal opinions and the sole equipment of a group of individuals who propose to apply them in planning and controlling the economic life of the nation.

American industry, upon which the development of the nation has been built, and which alone can assure its existence and safety in the future, must begin to rule itself in the field of economic and political affairs by knowledge, and by the systematic application of knowledge through the same sort of scientific method by which it has achieved its unsurpassed success in the field of technical accomplishment and the productive arts.

Works Councils in American Industry

THE number of workers covered by employee-representation systems in the United States increased from 403-765 in 1919 to 1,263,194 in 1932, according to a tabulation made public today by the National Industrial Conference Board, in a report entitled "Collective Bargaining through Employee Representation."

"The history, present scope, and importance of this form of collective relationship in American industry make it impossible to ignore works councils as a factor affecting the successful operation of the National Industrial Recovery Act," says the Conference Board's report.

"Conditions incident to the business depression furnished a severe test of the value of employee representation," continues the report. "Works councils were called upon to deal with the most difficult of all problems concerning working conditions, discharge of employees and reduction of wage rates. If they survived so exacting a trial, they indeed justified their existence."

Although the number of concerns with employee-representation systems declined 28 per cent from the peak of 432 in 1926 to 313 in 1932, the number of employees covered declined only 8 per cent or from 1,369,078 to 1,263,194.

"With general industrial employment declining about 40 per cent between 1926 and 1932, while the number of employees covered by employee-representation systems was declining only 8 per cent, these systems would appear without question to have held their ground," the Conference Board concludes.

It is significant, according to the report, that over 85 per cent of the employee-representation systems found to exist in 1932 had been in continuous operation for more than 10 years.

Philadelphia Metal Employment in June

JUNE employment in the 41 firms on the monthly labor turnover report of the Metal Manufacturers' Association of Philadelphia totaled 22,-533, an increase of 7 per cent. Of the 41 firms reporting 21 showed increased employment. Employment in all groups increased, the largest being in the heavy pressed metal and light pressed metal groups. Total average employment, although 15.1 per cent less than June, 1932, was higher than any month since December of last year.

From May to June man hours increased 9.7 per cent. Average weekly operating hours of approximately 40½ in May advanced to about 41½ in June. Seventeen firms reported lengthening their operating week.

In a much larger group of firms, having normally in the aggregate about 70 per cent of the total estimated employment in the metal working industry of this area, employment is now about 52 per cent of the average employment of 1926.

Large Increase In G. M. Export Shipments

EXPORT shipments of cars and trucks from General Motors plants in the United States and Canada during the month of June were 127 per cent greater than in the corresponding month last year.

In the sales abroad of its foreign-source products, General Motors is also running well ahead of the business done a year ago, with both the English Vauxhall and Bedford and the German Opel and Blitz displaying unusual strength since March, chiefly in their respective countries of manufacture.

Steel Production Shows Signs of Having Reached Summer Peak

National Ingot Average Recedes Slightly—New Steel Code Clarifies Price Situation—Pig Iron, Scrap and Coke Prices Register Advances

FINISHED STEEL releases continue to run behind those of last month, but mill backlogs have not been materially reduced. Pressure for deliveries is still severe, particularly from the automotive industry. New demand from that source, however, has declined, indicating that some of the motor car manufacturers are apprehensive of a reduction in their production schedules in August. Similar caution earlier in the year proved to be unwarranted, and it is possible that present estimates fail to take into account current accessories to mass buying power from wage advances, increased farm prices and higher security markets.

Uncertainty in the automotive field is offset, in part at least, by the removal of uncertainty regarding iron and steel prices. The adoption of a code by iron and steel producers has clarified the price situation materially, causing concessions to disappear on virtually all products and overcoming lingering consumer reluctance to accept recent advances. Establishment of a single quotation for all buyers, under the provisions of the code, will wipe out preferences enjoyed by larger users and will mean higher realization prices to mills. Already buyers are hastening to enter specifications against bars, plates, shapes and other products on which prices were extended through this month. Pig iron releases likewise are increasing, not only on account of-the certainty of a rising market but also because of increased foundry melt.

THE wage advances that have been put into effect by iron and steel producers, together with rising costs of fuel, scrap and other raw materials, have destroyed the last doubts of the trade about the permanence of recent price increases. Undeniably buyers have been purchasing further ahead than usual, but it is by no means established that they have accumulated excessive inventories. A survey of a large number of representative iron and steel users by THE IRON AGE discloses that, in most cases, increased consumption has paralleled increased purchases of materials.

Steel production has apparently gone about as far as it can without the support of the heavy industries. While ingot output has increased from 49 to 50 per cent at Pittsburgh and from 40 to 41 per cent in eastern Pennsylvania, there have been recessions in the Cleveland-Lorain district, in the South and at Buffalo and the national average has declined from 59 to 58 per cent of capacity.

PRIVATE building continues to lag, although giving scattered indications of incipient revival. Public work is not yet appearing in significant volume. Fabricating awards, at 7950 tons, compare with 27,225 tons a week ago. Lettings of reinforcing steel, at 7400 tons, include 3000 tons for a Milwaukee sewage plant.

Railroad purchases of steel for car and locomotive repairs are gradually increasing, but the carriers are unlikely to abandon their present caution before June and July earnings statements have been analyzed.

Farm equipment programs, heretofore limited mainly to the manufacture of repair parts, have now been enlarged to include the production of new machinery. Export business in agricultural implements has been showing a steady increase.

Indications that activity in the reborn brewing industry may have been overdone are seen in the abandonment of several proposed plant construction projects.

SCRAP prices continue to rise throughout the country. Advances in heavy melting steel at Pittsburgh, Chicago and Philadelphia have raised THE IRON AGE scrap composite from $10.88 to $11.58 a ton. Furnace coke has risen another 25c. a ton to $2.50, Connellsville. Fluorspar has been marked up to $14 a ton, domestic mines. Advances of $1 a ton in pig iron prices, now effective in virtually all markets, have caused THE IRON AGE pig iron composite to rise from $15.17 to $15.90 a ton. The finished steel composite is unchanged at 1.973c. a lb. Bolt, nut and rivet manufacturers have extended present discounts and prices through the third quarter.

Reflecting the pronounced gain in iron and steel works operations, consumption of Lake Superior ore in June amounted to 1,894,004 tons, an increase of 628,381 tons over May. There were 164 Lake vessels in commission July 15, a gain of 65 since June 15.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	July 18, 1933	July 11, 1933	June 20, 1933	July 19, 1932
Per Gross Ton:				
No. 2 fdy., Philadelphia	**$17.34**	$16.34	$16.34	$14.34
No. 2, Valley furnace	**16.50**	15.50	15.50	14.50
No. 2 Southern, Cin'ti	**17.51**	16.51	16.51	13.82
No. 2, Birmingham	**13.00**	12.00	12.00	11.00
No. 2 foundry, Chicago*	17.00	17.00	16.00	15.50
Basic, del'd eastern Pa	**17.09**	16.09	16.09	14.50
Basic, Valley furnace	**16.00**	15.00	15.00	13.50
Valley Bessemer, del'd P'gh	**18.89**	17.89	17.89	16.89
Malleable, Chicago*	17.00	17.00	16.00	15.50
Malleable, Valley	**16.50**	15.50	15.50	14.50
L. S. charcoal, Chicago	23.17	23.17	23.17	23.17
Ferromanganese, seab'd carlots	82.00	82.00	68.00	68.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$40.00	$40.00	$40.00	$43.00
Light rails at mill	30.00	30.00	30.00	32.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.60
Bars, Chicago	1.70	1.70	1.70	1.70
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.95	1.95	1.95	1.95
Tank plates, Pittsburgh	1.60	1.60	1.50	1.60
Tank plates, Chicago	1.70	1.70	1.70	1.70
Tank plates, New York	1.598	1.598	1.598	1.898
Structural shapes, P'gh	1.60	1.60	1.60	1.60
Structural shapes, Chicago	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.86775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	1.70
Hot-rolled strips, Pittsburgh	1.60	1.60	1.55	1.45
Cold-rolled strips, Pittsburgh	2.25	2.25	2.00	2.00

Finished Steel

	July 18, 1933	July 11, 1933	June 20, 1933	July 19, 1932
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.25	2.25	2.10	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.35	2.35	2.20	2.30
Sheets, galv., No. 24, P'gh	2.85	2.85	2.70	2.85
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.80	2.95
Hot-rolled sheets, No. 10, P'gh	1.65	1.65	1.50	1.55
Hot-rolled sheets, No. 10, Chicago dist. mill	1.75	1.75	1.60	1.65
Wire nails, Pittsburgh	2.10	2.10	1.85	1.95
Wire nails, Chicago dist. mill	2.15	2.15	1.90	2.00
Plain wire, Pittsburgh	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., P'gh	2.60	2.60	2.35	2.60
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.40	2.65
Tin plate, 100 lb. box, P'gh	$4.25	$4.25	$4.25	$4.75

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	**$13.25**	$12.12½	$11.75	$8.25
Heavy melting steel, Phila	**10.75**	10.25	9.25	6.25
Heavy melting steel, Ch'go	**10.75**	10.25	8.87½	4.75
Carwheels, Chicago	**10.50**	9.50	9.50	5.50
Carwheels, Philadelphia	**12.75**	12.25	10.25	8.00
No. 1 cast, Pittsburgh	**11.25**	10.50	10.50	9.50
No. 1 cast, Philadelphia	12.25	12.25	10.25	8.00
No. 1 cast, Ch'go (net ton)	10.50	10.50	8.75	6.00
No. 1 RR. wrot., Phila	10.75	10.75	10.75	8.50
No. 1 RR. wrot., Ch'go (net)	**9.00**	8.00	6.50	3.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	**$2.50**	$2.25	$1.75	$2.00
Foundry coke, prompt	3.00	3.00	2.50	3.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	8.75	8.75	7.75	5.00
Lake copper, New York	9.00	9.00	8.00	5.37½
Tin (Straits), New York	**48.00**	46.00	44.95	20.80
Zinc, East St. Louis	**5.00**	4.85	4.35	2.50
Zinc, New York	**5.37**	5.22	4.72	2.87
Lead, St. Louis	4.35	4.35	4.05	2.50
Lead, New York	4.50	4.50	4.20	2.65
Antimony (Asiatic), N. Y.	**7.50**	6.75	6.50	5.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
July 18, 1933	1.973c. a Lb.	$15.90 a Gross Ton	$11.58 a Gross Ton
One week ago	1.973c.	15.17	10.88
One month ago	1.892c.	15.01	9.96
One year ago	1.976c.	13.76	6.42
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1933	1.973c., July 5	1.867c., Apr. 18	$15.90, July 18	$13.56, Jan. 3	$11.58, July 18	$6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Scrap Prices in Sharp Advance at Pittsburgh

Heavy Melting Grade Sold at $13.50—Pig Iron Up $1 a Ton—Steel Output Maintained and Code Clarifies Price Situation

PITTSBURGH, July 18.—Finished steel releases are still running slightly behind the comparatively high June level, but a fair amount of new business at full quoted prices is being booked, and continued high production schedules have not reduced backlogs materially in this district. On tin plate, for instance, output continues to run behind new specifications, although mills are at close to capacity.

The character of finished steel demand has not changed materially. Railroad purchases, as represented by miscellaneous demand from car repair shops, are improving, but inquiries for rails and rolling stock are still absent. Demand for structural steel and reinforcing bars has failed to gain, even though the volume of small private projects is well sustained. Shipments to the automotive industry are undiminished and some new buying is reported. A decline in the new requirements of jobbers and small miscellaneous consumers is reported in some quarters, but shipments against June specifications to such users are still heavy. The inability of mills to make quick deliveries against such orders without stepping up rolling schedules sharply is helping to extend backlogs, and even though current ingot production may not rise much further in the next month, it is not expected to decline.

Pittsburgh district plants are making steel this week at a 50 per cent rate, and two steel works blast furnaces have been blown in. In the Valleys and nearby northern Ohio, mills production is holding at 65 per cent, and another blast furnace is being added. Wheeling district output is well sustained at 90 per cent of capacity.

Market interest is centered on the proposed code for the steel industry, which has been submitted to the National Industrial Recovery Administration. The commercial phases of the plan are widely approved, and indicate a stable market for the steel industry at current price levels as soon as the existing contracts have been completed. Establishment of a single quotation to all users will mean definitely higher realization prices to the steel industry, and the setting up of a single basis of terms for payment should eliminate many current difficulties. Elimination of consignment selling, except in the case of pipe, is also considered highly constructive. A few new basing points are suggested on some products, notably Canton, Ohio, for semi-finished steel.

Presentation of the code has clarified the current price situation considerably, and concessions are rapidly disappearing on all finished steel products.

Pig iron prices have been advanced $1 a ton at Pittsburgh and in the Valleys, and scrap quotations have advanced from $1 to $2 a ton in the most abrupt upward adjustment which has occurred in the recent movement. Coke prices are also higher because of increased labor costs, and a definite shortage in the furnace grade.

Pig Iron

Valley and Pittsburgh district merchant furnaces have advanced quotations on the principal grades of iron $1 a ton, changes having been effective immediately. Basic iron is now quoted at $16, Valley furnace, foundry and malleable at $16.50, and Bessemer at $17. The Pittsburgh producer is quoting prices 50c. a ton higher. In view of the fact that the advance was made suddenly, following increased prices in practically all other districts, consumers were given no opportunity to cover at the old levels, and some small sales have already been made at the higher prices. A few buyers had already been covered through the quarter, but sellers have recently been unwilling to take business beyond July 31, and the new prices should become effective on shipments much more quickly than might ordinarily be the case.

Semi-Finished Steel

Shipments of billets, slabs and sheet bars continue heavy, although little new buying has been reported. Strict adherence to $26, Pittsburgh or Youngstown, represents an advance to some large buyers whose specifications have not been entirely completed, but the end of the month will probably see the market on a definite single price basis. Users of forging billets are rapidly covering their third quarter requirements at $31, Pittsburgh, while wire rods are now available for the entire quarter at $35, Pittsburgh or Cleveland. The steel industry's new code, which is being presented in Washington this week, provides for a basing point at Canton, Ohio, on billets, slabs and sheet bars.

Rails and Track Accessories

The local rail mill is beginning to roll against its recent order for export to Brazil, and will work in this tonnage with sheet bars for several weeks. No new buying is reported, but the Erie and Nickel Plate are reported to be considering small releases against old orders. Demand for accessories is holding up well for this time of the year.

Bolts, Nuts and Rivets

Specifications continue comparatively heavy, and some producers report no falling off from the June rate. Orders at the former low prices have now been fairly well worked out, and the market is well sustained at 73 per cent off list on bolts and nuts, and $2.50, Pittsburgh or Cleveland, on large rivets.

Bars, Plates and Shapes

Demand for heavy hot-rolled products has shown little change in the last week. Structural and reinforcing bar awards continue rather light, and Federal inquiry is not appearing in significant volume. Private projects are small but more numerous than they have been in two or three years. Demand for plates is holding up well, particularly from barge builders and railroad repair shops. The Pennsylvania has practically doubled its repair program for the immediate future, and all of the carriers in this district are increasing their requirements for miscellaneous tonnage. Specifications for merchant bars are increasing as the end of the month approaches. All old contracts must be taken up by July 31, when the minimum price of 1.60c., Pittsburgh, is established for the remainder of the quarter. No decline in the volume of alloy steel bar shipments to the automotive industry is noticed.

Cold Finished Steel Bars

Makers are still deferring forward commitments pending final settlement of the price of hot-rolled bars to cold-finishing mills. In the meantime, the prospect of a price advance on cold-finished is forcing in a little additional tonnage. The base price of 2.10c., Pittsburgh, is very well held.

Tubular Goods

Mills have not yet completed shipments of tonnage contracted for before the recent price advance, but new business is off considerably. Oil country goods are in very light demand, and scarcely any line pipe tonnage is coming out. Standard pipe continues to be the most active line, with production holding up fairly well in the nearby plants. Makers of lap-weld steel and charcoal iron boiler tubes will probably announce price

revisions this week to conform with the lower discounts on seamless boiler tubes which came out recently.

Wire Products

Recent quotations on manufacturers' wire and spring wire have been extended through the remainder of the quarter, with shipments on such contracts to be completed by Sept. 30. Heretofore new business was taken only for July. The new schedules on merchant wire products have not been tested by much new buying, but specifications against old contracts have been heavy, and some producers have not yet exhausted their backlogs.

Sheets

With production still confined largely to tonnage which came in during June on old contracts, mills are devoting their attention to new business at the higher prices. A goodly number of users have covered for the remainder of the quarter at the new levels, although on the highly finished grades, on which the advances were larger, considerable buyer opposition is encountered. Sheet releases during July have fallen considerably under the June level, but mill backlogs have been only partially worked out, and the present production rate of 55 to 60 per cent of capacity can easily be maintained for several weeks.

Tin Plate

Although the number of mills operating in the tin plate industry this week will be slightly higher than before, the leading interest is confining production strictly to 16 turns, and total output will be unchanged at about 95 per cent of capacity. Other producers are avoiding extra turns whenever possible, in spite of the fact that incoming specifications are running ahead of production in some instances. No change in the price of tin plate is contemplated by the leading maker in the near future.

Strip Steel

Specifications are fairly well sustained but new buying at the higher prices announced recently is very light. Practically all producers are quoting hot-rolled strip at 1.65c., Pittsburgh, and cold-rolled at 2.25c., Pittsburgh or Cleveland, but a considerable tonnage had been taken at lower levels for shipment over the entire quarter in some instances. Cooperage stock is quoted at 1.75c., Pittsburgh, or at the usual $2 differential over hot-rolled strip.

Coke and Coal

The coke market has gained further strength with sharp wage advances instituted by most of the leading producers. One large seller of furnace coke would not even contract for the remainder of the month at less than $3.25, Connellsville, although lower figures are still heard on small spot orders. The foundry grade is also strong but not quotably higher. Announcement of coal prices is deferred, pending the approval of a code for the industry, and buyers do not seem to be interested in speculative coverage.

Scrap

A mill purchase of a tonnage of No. 1 heavy melting steel this week at $13.50, a full dollar a ton over the most recent sale into consumption, has advanced the scrap market sharply in this district. Dealers who participated in the $12.50 order last week are already paying well over the sale price to cover, and their unwillingness to take further business at even $13.50 indicates the continued rising trend in the market. The other grades of scrap have also been advanced, with a sale of No. 2 steel at $12, and a machine shop turnings at $11. Specialties have been sold at $14.50 and possibly more, although the foundry grades have not fully reflected the strength in steel works material. In the Youngstown district sales at $14 are reported. The sharp advance in prices had not been entirely unexpected, as scrap quotations in the Pittsburgh district have failed to keep pace with other consuming centers in the last six weeks. Many of the large buyers have been well covered, and others had pursued the policy of establishing comparatively low offering prices, which brought in small tonnages for a number of dealers.

Pig Iron Up $1 a Ton in South

BIRMINGHAM, July 18.—The price of pig iron was advanced $1 a ton last week by all producers in this district, and the new quotation for No. 2 foundry, at furnace, is $13. This applies only to third quarter tonnage, as the local furnaces are not yet booking for fourth quarter. The increase will not affect a large part of the third quarter melt, as most of the foundries had already covered their requirements at the old price of $12. Foundry activities, with the exception of pipe, seem to be following a steady course, as indicated by iron shipments. These are running ahead of June.

Cast iron pipe is still waiting for the public works program to start. July has not yet brought much improvement.

Nine blast furnaces are active, four being on basic iron, four on foundry and one on recarburizing iron. The Tennessee Coal, Iron & Railroad Co. has changed one of its Ensley furnaces from basic to recarburizing iron. Republic Steel expects to blow in a second stack just as soon as repair work is completed, which will be around Aug. 1.

Steel

Last week's steel bookings were not up to the high average of the preceding four or five weeks. This was probably just a periodic lull, as the outlook still is favorable. New business for the first half of July was larger than for the same period in June. Tonnage already booked assures steady operations at the present rate all through the month. Open-hearth operations last week varied from 18 to 19 active units. The schedule for this week is 18.

Pig Iron and Scrap Higher at Boston

BOSTON, July 18.—The Mystic Iron Works has advanced pig iron $1 a ton, and has established 25c. a ton differentials for every 25 points of silicon, instead of the usual 50c. for 50 points of silicon. Buffalo, Alabama and eastern Pennsylvania iron prices have been adjusted accordingly, but local furnace representatives have not as yet received details. In anticipation of higher prices, buyers purchased more than 2500 tons of Mystic, Buffalo, Dutch and Indian brands, practically everything for July delivery. Furnaces, however, have opened their books for third quarter delivery. Indian iron is firm at $17 to $17.50 a ton, on dock here duty paid, which is about on a parity with domestic brands where the freight rate is $2 a ton.

Local scrap prices show more animation than they have in months, there having been advances all along the list. Actual transactions, however, are rather limited, as owners of scrap continue to hold for higher prices. No. 1 heavy melting steel is now $6 to $6.25 a ton, on cars shipping point, mostly $6.15 to $6.25. Heavy breakable cast is $5.25 to $5.50 a ton, up 75c. from a week ago. A Worcester, Mass., consumer has offered $6.25 a ton, delivered, for No. 2 steel, but based on prices offered by brokers the delivered Worcester price is far out of line. Consequently little material has been obtained by the melter. Some fair tonnages of textile and No. 1 machinery cast for Pennsylvania delivery are being moved at $5.50 to $6 a ton, on cars shipping point.

Pipe Lines

Texas Pipe Line Co., Wichita Falls, Tex., has authorized 6-in. steel pipe line for crude oil from Bryson, Jack County, to point near Newcastle, Young County, about 15 miles. Cost about $150,000.

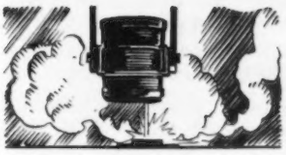
Sabinal, Tex., plans welded steel pipe line for natural gas distribution.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 28 for 10,000 ft. steel or wrought iron pipe (Schedule 2887).

Krieger Oil Co., Lodi, Cal., has secured permission for 8-in. steel pipe line in Garrard Boulevard, Richmond, Cal., in connection with new bulk oil storage and distributing plant. Entire cost about $40,000.

Richard Schwab, Livingston, Tex., operating local oil well property, has engaged Polk County Engineering Co., Livingston, to install steel pipe line to Goodrich, Tex., about eight miles, where connection will be made with storage and distributing plant, soon to be built.

Chicago Output Holds at 60 Per Cent of Capacity



New Business in Steel Off 25 Per Cent But Specifying is in Steady Volume—Pig Iron Shipments Gaining

CHICAGO, July 18.—Although steel mills have put into effect wage advances of 15 per cent, there is growing belief that most prices for finished steel will remain stationary for the time being, if not for the third quarter. On some products on which third quarter prices have been announced buying has been stimulated, and with the end of July close at hand, it is quite likely that more third quarter price announcements are in the near offing.

Sellers of finished steel report new sales off from 25 to 35 per cent as compared with the June level. However, specifications remain reasonably steady and ingot output is unchanged at 60 per cent of capacity.

Farm implement manufacturers are starting production on new machinery and report that export business is showing a steady increase. It is believed in some quarters that brewery expansion is being overdone, but at present there is a substantial flow of business from this source.

Foundry melt is gaining and shipments of Northern foundry iron are running ahead of the June rate. Scrap remains strong and most sales mark new high prices.

Pig Iron

New prices for Northern foundry iron are firm and the trade is beginning to weigh the effects of higher costs, which are inevitable as a result of increased wages and more expensive coal. Another advance in pig iron would, therefore, not surprise many in the trade. Sales are again beginning to gain momentum, following a temporary setback resulting from announcements of the new price schedule. Shipments are still increasing and at the present rate will show substantial gains over the average in June.

Reinforcing Bars

Expectation of price advances is leading contractors to place orders for bars as promptly as contracts are signed. Shipments are larger, but current business is still composed mostly of small tonnages among which there is now a fair sprinkling of private jobs. Indiana is buying road steel and will soon take bids on 1000 tons. Illinois has adopted a new design for slabs which calls for 6 tons of bars per mile instead of 10 tons per mile. However, more strip will be used in the new design.

Cast Pipe

Chicago has ordered 875 tons of pipe, but Milwaukee is delaying an award of 500 tons pending decision as to inclusion of the project in the national public works program. Sellers know of hundreds of projects, all dependent on funds from the Federal Government. East Chicago, Ind., plans a sewage plant and Hammond, Ind., wants to build a filter plant. Prices are firm but purchases are very small.

Rails and Track Supplies

Rail mills in this district continue with programs which will permit the rolling of small tonnages through the remainder of July and part of August. There is no active inquiry, but a number of Western railroads are expected to purchase moderate tonnages early in the Fall. Both new orders and specifications for track fastenings are steady and in substantially better volume than rail releases.

Plates

A Milwaukee brewer has placed 600 tons of plates and a brewery in Indiana has ordered a like tonnage. Several new brewery projects have recently been dropped and it is possible that existing breweries have about satisfied their need for aging tanks. Tank fabricators are fairly well engaged and locomotive shops are taking more steel.

Wire Products

New business is lighter, but the drop is smaller than usual for this season. Output is steady at about 65 per cent of capacity and prices are firm. Utilities are backward in ordering and little wire rope is moving to oil producing areas. Indications are that July automobile output will exceed that of June, though it is conceded that curtailment can come on very short notice.

Structural Material

The State of Illinois is taking new bids on the 1500-ton Justice Park viaduct and also will take tenders on 1300 tons for a bridge across the Illinois waterway at Morris. Construction work in this area continues to lag.

Bars

New orders for bars are holding up better than new business in most other finished steel products. The automobile industry, a large user of bars, is still operating at a high rate. Farm implement manufacturers are taking more steel, some of which is now going into new machinery. Exports of farm machinery are the best in nine months with the exception of March. Rail steel bar mills are producing near capacity.

Sheets

Output remains at 65 per cent of capacity, with the bulk of shipments going to manufacturers of automobiles, barrels and containers. Shipments are still moving to roofing manufacturers but new orders from that source are off sharply.

Scrap

A mill has taken a small tonnage of heavy melting steel at $10.75 a gross ton and is now in the market for a large tonnage. Dealers are having trouble obtaining this grade on offers of close to $11 a ton. There is an active market for steel wheels. One mill in this district is taking cast iron borings and as a consequence trading in that grade is reviving. Small lists are being offered by the Burlington and Milwaukee.

Further Advances in Scrap at Detroit

DETROIT, July 18.—The scrap market is very strong, with higher prices prevailing. Shipments are running somewhat heavier than normal and would be even larger if sufficient material were available. Still higher prices are indicated for coming week.

To Remove Mill from Penn-Seaboard Plant

Allegheny Steel Co., Brackenridge, Pa., is planning early dismantling of the blooming mill at the old Baldt works of the Penn-Seaboard Steel Corpn., New Castle, Del., recently acquired. The mill will be removed to Brackenridge, where it will be reconditioned for future service. Work will be carried out under direction of Macintosh-Hemphill Co., Pittsburgh.

On July 1, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to a total of 16,568 net tons, according to an announcement issued today.

Demand Remains Active in Eastern Pennsylvania

Steel Specifications Are in Fair Volume—Pig Iron Business Stimulated by Heavier Melt and Price Advance

PHILADELPHIA, July 18.—Mills still are receiving specifications in fair volume. They are below those that were rushed to mills the latter part of June to cover on second quarter contracts but have added substantially to backlogs. Some of the present specifying represents coverage on prices which have been extended through July on plates, shapes and bars. Some mills also have announced extension of prevailing prices on sheets and strip steel through the third quarter for shipment not later than Oct. 15. While these prices, advanced $3 per ton over second quarter levels, are subject to change, they are being accepted until further notice.

New business in sheets, mostly from the automotive trade, is holding up well, although there are reports that the market has been shaded somewhat.

Foundries are increasing purchases of pig iron since the increase of $1 per ton. The scrap market continues to advance and is especially strong.

The trade feels that the market will become well stabilized when approval is given to the code of fair competition. Principles set forth in the code for governing prices are looked upon as being altogether encouraging in this direction. The wage and salary increases, however, will boost costs considerably and will be particularly felt by high-cost producers. Open-hearth operations have moved up one point to 41 per cent of capacity.

Pig Iron

Substantial increases in the foundry melt have brought about improved business in pig iron. While bookings are mostly for small lots, they have spread considerably. Some foundries which recently were operating only two or three days have moved up schedules to four, five or six days a week. The $1 per ton increase in pig iron prices has also been a factor in stimulating purchases. The new quotations are for the third quarter and under them No. 2 foundry takes a base of $16.50, for 1.75 to 2.25 per cent silicon. Beyond this base the silicon differentials were reduced to 25 points from 50 points, with 25c. per ton for each 25 points. New prices of other grades at furnace are: basic, $16.25, and malleable, $17.

Plates, Shapes and Bars

Extension of the lower prices to the end of July has developed moderate specifications. After these prices are wiped from the books, the levels of 1.60c., Pittsburgh, on steel bars; 1.70c., Coatesville, on plates; and 1.70c., Bethlehem, on standard and wide-flange shapes, will be quoted. Under the steel code of fair competition, Pencoyd, Pa., is eliminated as a base for quoting shapes. The base then will become Bethlehem. The freight rate from Pencoyd to Philadelphia is 4.95c., while from Bethlehem it is 11.55c. Under the new system, the present differential of $1.32 per ton in favor of Pencoyd would be done away with.

Sheets

Automotive demand for strip is holding up well. Mills are operating at high rates of capacity in order to make deliveries which are being urged by automobile body builders. Nevertheless there are reports that prices have been shaded somewhat. While made subject to change, mills have extended present prices on sheets and strip steel through the third quarter for shipment not later than Oct. 15. These levels are $3 over those prevailing in the second quarter.

Warehouse Business

Demand is fair. Swedish iron bars have been advanced from 5.60c. to 6c. a lb.

Imports

The following iron and steel imports were received here last week: 1457 tons of pig iron from British India, 30 tons of steel bands, 20 tons of steel bars and 20 tons of structural shapes from Belgium, and 6 tons of steel tubes and 6 tons of steel bands from Sweden.

Scrap

The market continues to advance but the actual price situation is indefinite. Brokers are having difficulty in getting tonnage because it is being held by sources of supply. The result is that dealers do not know what to quote and some have paid from $10.50 to $11 for No. 1 and $9.50 for No. 2 heavy melting. Further sharp rises are predicted by dealers. Mills are becoming more anxious about covering requirements.

Active Demand for Scrap at Buffalo

BUFFALO, July 18.—Placing of pig iron business continues in satisfactory volume. An inquiry for 2000 to 3000 tons of foundry has come out of the East; General Electric Co. is in the market for 1000 tons and Westinghouse Electric for 500 tons. Several 100, 200 and 300-ton lots are out. Prices have been advanced $1 a ton to $17, base Buffalo, for foundry and $17.50 for malleable, and business has been booked at the new figures.

Steel

Ingot output is off slightly, the Lackawanna plant of Bethlehem having taken off one open-hearth, reducing the number of its active furnaces to 15. Republic continues to operate five and Wickwire-Spencer two. The Seneca division of Bethlehem is operating its sheet mills at 70 per cent.

Scrap

Sales of No. 1 heavy melting steel and No. 2 heavy melting steel have been made at advanced prices. One mill purchased No. 1 at $11 and No. 2 at $10. Another sale was made at $10.25 for No. 2. Through a reciprocal arrangement with a large Detroit automobile maker, the largest local consumer of scrap is said to have acquired about 50,000 tons of various grades, which are being shipped by boat. Considerable boat scrap is coming from New England points via New York and the barge canal. It is doubtful if a large tonnage of No. 1 steel could now be bought here for less than $12.

Building Steel Awards Heavier on Coast

SAN FRANCISCO, July 17.—Activity in southern California has shown a marked improvement, with awards for 2102 tons of reinforcing bars, 2337 tons of structural steel and 1790 tons of plates reported during the week. At Los Angeles the Walker Loft building, calling for 1200 tons of structural steel and 300 tons of bars went to the Consolidated Steel Co. and the Soule Steel Co. respectively. The 2500 tons of plates and structural for tunnel supports for the Metropolitan Water District were divided between Commercial Shearing & Stamping Co. and McClintic-Marshall Corpn. Pacific Coast Steel Corpn. took 1170 tons of reinforcing on five projects.

Bids have been taken but no award

has yet been made on the 30,000 tons of structural steel for towers for the Metropolitan Water District at Los Angeles. At Alderwood Manor, Wash., bids have been taken on 60 miles of pipe line which will require 3696 tons of cast iron pipe, while Seattle has taken bids on 1110 tons of 24 and 30 in. The warehouse price on common nails is now $2.70, base per keg, at Seattle. New steel inquiries and awards in northern California and in the Northwest have been confined to small tonnages.

Further Gain in Steel Demand at Cincinnati

CINCINNATI, July 18. — Simultaneous advances of $1 a ton on both Northern and Southern iron have been announced. The new base price on Hamilton iron, delivered in Cincinnati, is $18.01, while Southern is quoted at $17.51 for delivery here. The Southern price is still figured at 50c. under the nearest Northern competitor. Quotations on Lake iron, for delivery in Cincinnati, are approximately $19.40 a ton. An additional 12c. will be added to intrastate shipments on July 18 when the freight surcharge is returned.

A three-day warning of the price increase stimulated purchases of both Northern and Southern iron, and orders last week totaled about 2500 tons. Of this about 500 tons, in small lots, was Southern. An Ohio melter bought 450 tons of Northern foundry and two Indiana consumers bought 300 tons each.

Warehouse Business

Demand is being sustained at the record-making level of June, despite the absence of building demand. Bookings are almost entirely from industrial sources.

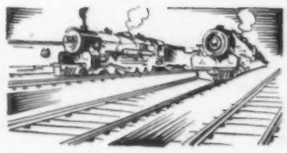
Steel

Steady improvement of steel demand has drawn heavily on the supply of skilled labor and mills are experiencing difficulty in obtaining sufficient workers capable of handling current business. Bookings, the past week, exceeded 75 per cent of mill capacity and although rolling schedules have been enlarged, backlogs on ternes, galvanized and some grades of annealed sheets have increased. Present prices are holding firm and mills are accepting actual orders for the remainder of the quarter, but quotations are subject to change without notice.

Scrap

Mills have abandoned pressure on prices, accepting scrap at the market. Trading, however, is limited to small transactions for immediate needs. A further uptrend in dealers' bids has brought more material into the market, giving an easier tone to the market generally.

Pressure for Deliveries Unrelaxed at New York



Few Evidences of Speculative Buying; Eastern Plate Price Expected to Go Up Aug. 1; Tin Mills Booked Full Until October

NEW YORK, July 18.—Pressure for steel deliveries is unrelaxed, indicating that material is passing rapidly into use. While consumers undoubtedly have been buying further ahead than usual, tonnage purchased for stock is being used, in many cases, earlier than had been planned. There are few indications that excessive inventories have been built up. New buying is still light, although the number of new orders placed at the advanced prices is larger than had been expected. This is particularly true of certain grades of sheets. Meanwhile shipments are in undiminished volume. Tin plate mills are being pressed to meet the delivery requirements of customers and are assured of sustained operations until October.

Pipe demand is still light and railroad orders are slow in materializing. However, the steady growth of freight traffic and the appearance of sporadic car shortages point to early resumption of buying by the carriers. Plate producers report a sustained flow of small-tonnage specifications for miscellaneous tanks, brewery equipment and repairs. The Jones & Laughlin Steel Corpn. will furnish 1000 tons of reinforcing bars for a bottling plant to be built for the F. & M. Schaefer Brewing Co., Brooklyn. Plate prices are expected to be advanced to 1.70c., Coatesville, effective Aug. 1. The present market range is 1.40c. to 1.50c., Coatesville, for July specifications and shipment until Aug. 15.

Pig Iron

Eastern Pennsylvania iron has been advanced $1 a ton to $16.50, base, furnace, for third quarter delivery. Buffalo brands have also been raised $1 a ton for similar delivery, but furnace quotations will vary according to destinations. For shipment to northern New Jersey, the minimum price at Buffalo for No. 2 plain is now $15, while for delivery to other points in the metropolitan area the furnace quotation ranges 50c. a ton higher. Differentials of 25c. a ton for each 25-point range in silicon above the base grade have been generally adopted. With melters in this district well covered through the third quarter, the new prices have not been tested. Current sales are largely for prompt shipment. Bookings for the week totaled about 4500 tons, compared with 2000 tons the previous week and 3700 tons a fortnight ago. The General Electric Co., Schenectady, N. Y., has inquired for a tonnage for delivery to its Lynn, Mass., plant, and another large buyer is understood to be in the market for a round lot. General inquiry is still light, and little significant buying is expected before fourth quarter. The Port Henry, N. Y., stack will be lighted late in July. Foreign iron continues to be moderately active.

Reinforcing Bars

A noticeable lull in bar activity has developed. Dealers, however, expect more substantial specifying within the month as additional public works projects mature. Current prices are quotably firm, and are expected to remain steady throughout the quarter. A Brooklyn bottling plant, requiring 1000 tons, was the week's largest award. Additional lettings were 205 tons for a hospital at Sayre, Pa.; 125 tons for the Wassaic, N. Y., State school building and about 100 tons of bars and piling for bridge construction at Sandy Hook, Conn. The State of Connecticut will soon place 200 tons for highway construction, and a hospital kitchen building at Boston will require 300 tons.

Scrap

Sustained improvement in mill activity is keeping scrap prices extremely buoyant. During the past week, No. 1 heavy melting steel continued to rise and is currently established at $8 a ton, on barge. Although consumer interest is centered chiefly in the heavy melting grades, moderate movement of other grades has occasioned general advances of 50c. a ton. For barge loading, machine shop and short shoveling turnings are now quoted at $4.50, No. 1 blast furnace and cast borings at $4.25, and No. 1 heavy breakable cast at $6.75. Releases are in heavy volume, and current inquiry is considered sufficiently heavy to sustain prices at the higher levels. Brokers are experiencing increasing difficulty in obtaining tonnages at current prices. Japan, the only sizable foreign buyer of American scrap in the present market, recently purchased a good tonnage of heavy melting steel at a $1.25 advance over the preceding commitment.

British Iron and Steel Feel Summer Lull

LONDON, ENGLAND, July 18 (*By Cable*).—British pig iron is feeling the influence of the summer holiday season. Middlesborough producers are cutting foundry iron prices for export and considering lowering the export price and at the same time raising the price in the home market.

Heavy steel demand is poor in general, but rail and structural orders show signs of improvement.

Exports of pig iron from the United Kingdom for June totaled 7000 tons, of which 40 tons were shipped to the United States. Total exports of iron and steel were 154,000 tons.

World shipbuilding at the end of June reached its lowest level for 40 years, being 732,000 tons.

The tin-plate pool is said to be operating in a satisfactory manner and most tin plate works have comfortable backlogs, but demand is quiet at present.

International Steel Cartel has announced the following quotas for July, August and September, the percentages listed being percentages of the basic quotas:

Semi-finished steel	46 per cent
Steel bars	67 per cent
Plates	50 per cent
Thick sheets	58 per cent

The Belgian Syndicate has reduced its price of steel bars for the United Kingdom by 2s. 6d. gold, but subsequently withdrew this concession. As a result, the market is somewhat confused. Belgian manufacturers and dealers are very dissatisfied at the paucity of general iron and steel sales and one plate works threatens to withdraw from the Belgian Syndicate at the close of this month.

British and Continental prices remain unchanged, although Continental steel bars and rods for South America were raised 10s., gold, per ton.

British Prices f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9		
Billets, open-hearth	£5	to	£5 7s. 6d.
Black sheets, Japanese specifications	£11		
Tin plate, per base box	17s.	to	17s. 6d.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hrth.	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage	£9		
Galvanized sheets, No. 24 gage	£11	to	£11 10s.

Continental Prices f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

*Ingots	£2 5s.		
*Billets, Thomas	£2 7s.		
Wire rods, No. 5 B.W.G.	£4 10s.		
Black sheets, No. 31 gage, Japanese	£11 5s		
*Steel bars, merchant	£3		
*Sheet bars	£2 8s.		
Plates, ¼ in. and up	£3 18s.	6d.	
*Plates, ⅞ in. and 5 mm.	£4 1s.		
*Sheets, ⅛ in.	£4 6s.		
*Ship plates	£4 10s.		
*Beams, Thomas	£2 16s.	6d.	
*Angles (basis)	£3		
Hoops and strip steel over 6-in. base	£3 12s.	6d.	
Wire, plain, No. 8	£5 7s.	6d.	
Wire nails	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.		

*Prices as established by European Raw Steel Cartel.

Canadian Steel Output Reaches 50 Per Cent

TORONTO, ONT., July 18.—Canadian steel output has risen to 50 per cent of capacity, with prospects for further gains in the near future. Following the receipt of new orders, the Algoma Steel Corpn., Sault Ste. Marie, Ont., last week started up its blooming and merchant mills and recalled an additional 130 men back to work.

Frederick C. Alderdice, premier of Newfoundland, has announced that a contract had been received from British ironmasters calling for 25,000 tons of Wabana iron ore. The order was the first received under the Newfoundland - Great Britain agreement reached at the British Empire economic conference.

New business in pig iron is gradually improving. While sales continue mostly in single-car lots, melters are appearing in the market at more frequent intervals. With the exception of a small tonnage of special grades, imports are negligible. Production is gaining, with four stacks now blowing. Prices are firm but unchanged.

Plans are under consideration for the erection of a 15-story building at Montreal to house the Superior, Appeal, Circuit and other courts, estimated to cost $8,000,000. About 15,000 tons of steel will be required. Bridge construction for Montreal and Quebec will represent another 10,000 tons of steel, and it is expected that awards soon will be announced.

Scrap demand is spotty. Export business is holding at a good level; some large shipments have been made to Britain, and others are said to be pending. Domestic demand for heavy melting steel and turnings, however, is small. Foundries are taking fair shipments of machinery cast, stove plate and malleable, while other lines are spotty to dull. Dealers are carrying big yard stocks and are showing little interest in adding to accumulations. Prices are unchanged.

Scrap and Pig Iron Higher at St. Louis

ST. LOUIS, July 18.—An advance of $1 a ton on pig iron was put into effect here Wednesday, raising prices of No. 2 foundry to $17, f.o.b. Granite City, and $17.85, delivered St. Louis. At the same time Southern iron was raised to $17.35, delivered St. Louis. In line with other centers, the silicon differentials have been fixed at 25c. for each 25 points. Because of contracts extending through the third quarter under which melters in the district have provided for most of their requirements, not much buying is expected until the next quarter opens. Shipments against contracts have been heavy. The market is firm.

Steel

Operations of open-hearth furnaces in the St. Louis industrial district are at about 30 per cent of capacity. Three of the four open-hearths in Kansas City are operating.

Structural shapes and plates have been firmly established at 1.70c., Chicago, for the third quarter, all concessions having been withdrawn. Hot-rolled steel flats have been advanced to 1.75c., Chicago. Buying has fallen off in virtually all lines.

Murch Brothers Construction Co., St. Louis, has been awarded the contract for the administration building for the local negro hospital, requiring 300 tons of reinforcing bars and 100 tons of structural steel.

Scrap

The scrap market, which had been stationary for several weeks, shot upward this week from 50c. to $1.50 a ton. Dealers say they were forced to advance their prices in order to get scrap to fill short orders. There was no buying by the mills largely because they and dealers have been unable to agree on prices.

Railroad Equipment

Draper Corporation, Beebe River, N. H., has purchased a 30-ton model M-L-6 gasoline locomotive from Fate-Root-Heath Co.

Ethyl Gasoline Corpn. has purchased six 3000-gal. and six 6000-gal. tank cars from General American Tank Car Corpn., New York.

Shawinigan Products Corpn., Shawinigan Falls, Canada, bought three 8000-gal. aluminum tank cars from General American Tank Car Corpn.

Youghiogheny & Ohio Coal Co. has purchased 325 steel mine cars from Watt Car & Wheel Co.

Steel Production Recedes in Cleveland District

Mills Feel Recession in Automotive Specifications — Bolt, Nut and Rivet Makers Extend Prices Through Quarter

CLEVELAND, July 18.—The lull in buying that followed the heavy volume of specifications late in June is still in evidence, although a fair amount of business in small lots continues to come out. Ingot output in the Cleveland-Lorain district declined four points this week to 70 per cent of capacity, one open-hearth furnace being shut down by the Corrigan, McKinney Steel Co. and one in Lorain.

Producers still have a good backlog of orders and recent finishing mill operations are being maintained. The automotive industry continues to crowd mills for deliveries of steel placed last month, but new demand from this source has declined, indicating that some of the motor car manufacturers will not maintain present schedules through August. However, more activity is expected from this source later in the month.

Business with forge shops that depend on other than the automotive industry shows considerable improvement and many metal-working plants in other fields are getting busier. Considerable public work in various forms is gradually developing and will come out later in the year. A Youngstown fabricator has taken 2000 tons of tunnel lining for a California water project.

Developments in the price situation were not numerous during the week. Bolt, nut and rivet manufacturers have extended through the third quarter present prices, which heretofore had been limited to July, and several sheet manufacturers who had named present prices only for July extended the prices through the remainder of the quarter.

Most mills and also pig iron producers will insert clauses in their contracts providing for price changes should these be deemed necessary because of the 15 per cent wage advance provided in the new steel code and already placed in effect by most steel manufacturers.

Bars, Plates and Shapes

New demand is less active than during the latter part of June, as requirements of most consumers are covered by shipments against second quarter contracts. However, many bar orders are being placed for small lots for quick shipment. Ohio has resumed its building program, which was suspended late last year, and will take bids shortly for bridges and other work requiring 200 tons of structural steel and several hundred tons of reinforcing bars. Steel bars are quoted at 1.65c., Cleveland, and plates and shapes at 1.60c., Pittsburgh. Concessions heretofore made to larger buyers will be withdrawn July 31.

Pig Iron

Several sales, including a 1000-ton lot at the $1 a ton price advance announced last week, have been made to foundries that were in need of iron. Other orders were for small lots. While inquiry is light, more activity is expected now that furnaces have opened their books for August and September shipment. Shipping orders still are far ahead of June. All producers have joined in the price advance. Both Northern and Southern makers have adopted the new method of quoting silicon differentials under which 25c. is charged for each 25 points of silicon above the 1.75 to 2.25 per cent base. Foundry and malleable iron are quoted at $16.50, Cleveland, for local and outside delivery.

Strip Steel

Most consumers still have considerable tonnage to be shipped against old contracts and new business is confined largely to fill-in orders that are being taken at the new prices. Two or three producers who had delayed in naming cold-rolled strip prices for the quarter have joined in the advance to 2.25c., Cleveland and Pittsburgh, definitely establishing the market on this basis. Hot-rolled strip is quoted at 1.60c. to 1.65c., Pittsburgh.

Sheets

Sales are being made in small lots at the new prices. Requirements of most consumers so far are being covered by specifications issued before the price advances. However, an increased volume of business is expected near the end of the month, particularly from the automotive industry. Mills generally are now quoting the new prices for the entire quarter, some heretofore having named them only for July. Certain mills are filled up so far ahead with tin plate and tin mill black plate orders that they are declining to take on additional tonnage. One mill is turning down orders for tin mill black plate at 2.50c. because of the large tonnage on its books taken at the old 2.30c. price. Vitreous enameling sheets, which were not advanced July 1, are now being quoted at 2.90c. for No. 20 for the quarter.

Bolts and Nuts

Manufacturers have extended through the third quarter the present prices of 73 per cent discount for bolts and nuts, $2.50 per 100 lb. for large rivets and 70, 10 and 5 per cent discount for small rivets. These prices were recently announced for July only. Contracts will be subject to changes that may result from increased cost due to the Industrial Recovery Act. Recent cap and set screw prices previously extended through July have also been extended through the quarter. Bolt and nut business continues to expand and the industry is now operating at 35 to 40 per cent of capacity.

Iron Ore

Consumption of Lake Superior ore in June amounted to 1,894,004 tons, a gain of 628,381 tons over May and comparing with 731,108 tons in June last year. Ore shipments continue to gain. There were 164 Lake vessels in commission July 15, a gain of 65 from June 15.

Furnace stocks of ore July 1 were 22,690,342 tons and the amount on docks was 4,788,748 tons. The total at furnaces and Lake Erie docks on that date was 27,479,090 tons, as against 32,158,672 tons on the same date last year. Dock stocks July 1 last year were 5,374,337 tons. Shipments from Lake Erie docks during June were 865,579 tons as against 265,845 tons during the same month last year.

Central district furnaces during June consumed 1,152,374 tons, an increase of 429,250 tons over May. Lake front furnaces used 738,381 tons, a gain of 197,690 tons, and Eastern furnace consumed 2792 tons, an increase of 984 tons. There were 82 furnaces in blast June 30 using Lake ore, a gain of 27 for the month.

Scrap

The market is very firm and prices have advanced 50c. a ton on most steel-making and blast furnace grades. Purchases of steel-making scrap were made by Valley district mills during the week at $13 for No. 1 heavy melting steel and $12 for No. 2, and dealers are paying up to $12.75 and $11.75 respectively for the two grades to fill these orders. While the supply is not plentiful, the higher prices are bringing out a moderate volume of scrap.

Fabricated Structural Steel

Lettings Decline—New Projects Slightly Higher

AWARDS of 7950 tons are considerably below those reported a week ago, which totaled 27,225 tons. The largest tonnage booked was 2000 tons for tunnel lining for the Metropolitan Water District of Southern California. New projects, at 8550 tons, compare with 5900 tons in the previous week and 15,950 tons two weeks ago. The outstanding inquiry is 3500 tons for a bridge at Yorktown, Va., on which bids will be opened July 21. Plate awards total 4335 tons. Structural steel lettings for the week follow:

NORTH ATLANTIC STATES

New Haven, Conn., 690 tons, Berkeley dormitory, to Lehigh Structural Steel Co.

New York, 2100 tons, Jacob Ruppert Co. brewery building, to Bethlehem Fabricators, Inc., through New York Steel Corpn., general contractor.

Long Island City, N. Y., 550 tons, E. & J. Burke brewery building, to American Bridge Co.; Post & McCord erectors.

Buffalo, 230 tons, repairs to Louisiana Street bridge, to Lackawanna Steel Construction Co.

Nazareth, Pa., 225 tons, tramway for Pennsylvania Dixie Cement Corpn., to Lehigh Structural Steel Co.

THE SOUTH

Clarksburg, W. Va., 225 tons, mill building for Pittsburgh Plate Glass Co., to Pittsburgh Bridge & Iron Co.

Rome, Ga., 615 tons, Tubize Chatillon mill building, to Virginia Bridge & Iron Co.

Texas City, Tex., 145 tons, condenser boxes, to Wyatt Metal Boiler Co.

CENTRAL STATES

Marion, Ind., 300 tons, E. J. Young Co. boiler house, to Duffin Iron Co.

Sangamon County, Ill., 190 tons, beam spans, to Continental Bridge Co.

Milwaukee, 580 tons. Fond du Lac Avenue viaduct, to Wisconsin Bridge Co.

Chicago, 275 tons, Santa Fe grain elevator, to Gage Structural Steel Co.

Austin, Minn., 200 tons, packing plant, to Crown Iron Works Co., Minneapolis.

WESTERN STATES

Denver, 150 tons, trash racks for Bureau of Reclamation, to Midwest Steel & Iron Works.

Las Vegas, Nev., 310 tons, trash racks for Boulder Dam, to Pacific Car & Foundry Co.

Naples, Cal., 195 tons, repairs to viaduct, to McClintic-Marshall Corpn.

Kern County, Cal., 100 tons, State highway undercrossing, to Kyle Steel Construction Co.

Los Angeles, 250 tons, Griffith Park planetarium, to Pacific Iron & Steel Co.

Los Angeles, 710 tons, tunnel supports for Metropolitan Water District, 500 tons to McClintic-Marshall Corpn. and 210 tons to Commercial Shearing & Stamping Co.

San Francisco, 2000 tons, tunnel lining for Metropolitan Water District of Southern California, to Commercial Shearing & Stamping Co., Youngstown.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Cambridge, Mass., 350 tons, post office.

Buffalo, 120 tons, sausage factory for S. M. Michalski & Co.

Mount Morris, N. Y., 800 tons, State hospital; bids July 20.

Delaware, Lackawanna & Western Railroad, 800 tons, Violet Street crossing at Cheektowaga, N. Y.

Pottsville, Pa., 200 tons, warehouse for brewery.

Freeport Mills, Pa., 150 tons, bridge over Swatara Creek for Lebanon County Commission; bids July 21.

Black's Crossing, Pa., 100 tons, beam span bridge for Lebanon County Commission; bids July 21.

Montgomery County, Pa., 100 tons, three-span bridge over Perkiomen Creek for Montgomery County Commission; bids in.

THE SOUTH

Yorktown, Va., 3500 tons, bridge; bids to be opened July 21.

CENTRAL STATES

State of Ohio, 200 tons, several highway bridges; bids to be taken July 28.

Morris, Ill., 1300 tons, bridge across Illinois waterway.

St. Louis, 100 tons, administration building negro hospital; Murch Brothers Construction Co., St. Louis, general contractor.

WESTERN STATES

Boulder Dam, Nev., 800 tons, miscellaneous requirements.

FABRICATED PLATE

AWARDS

Newburgh, N. Y., 155 tons, tank for Central Hudson Gas & Electric Co., to Chicago Bridge & Iron Works.

Gauley Junction, W. Va., 945 tons, tunnel lining and tanks for New Kanawha Power Co., to McClintic-Marshall Corpn.

Milwaukee, 600 tons, Blatz Brewing Co., tanks, to Milwaukee Bridge Co.

Logansport, Ind., 600 tons, tanks for Schmidt Brewing Co., to an unnamed bidder.

Corpus Christi, Tex., 110 tons, 24 and 36-in. welded steel pipe, to McClintic-Marshall Corpn.

San Francisco, 135 tons, Alameda Creek siphon, to American Concrete & Steel Pipe Co.

Los Angeles, 1790 tons, tunnel supports for Metropolitan Water District, to Commercial Shearing & Stamping Co.

Cast Iron Pipe

Providence, R. I., closes bids July 31 on 12,000 ft. of 12-in.

District of Columbia Commissioners have awarded 36,500 ft. of 6 to 16-in. to United States Pipe & Foundry Corpn.

Humble, Tex., plans construction of waterworks and sewerage systems, involving approximately 52,000 ft. of 6 to 10-in. cast iron pipe, pumping machinery and other equipment. Garrett Engineering Co., P. O. Box 1726, Houston, Tex., is supervising engineer. Catalogs requested.

Covington, Ky., plans installation of about 8000 ft. of 20-in. for new waterworks. Entire project will cost over $600,000. Extensions will be made in smaller distributing lines.

Louisville, Ky., has let contract to United States Pipe & Foundry Co. for 2400 tons for water supply system.

Forest, Ill., plans installation of 4 and 8-in. for extensions in water supply system; cost about $30,000. Warren & Van Praag, Milliken Building, Decatur, Ill., are consulting engineers.

Chicago has awarded 875 tons of 8-in. to Lynchburg Foundry Co.

Alhambra, Cal., T. B. Downer, water superintendent, plans installation of new main trunk and distributing pipe lines in connection with water system expansion and improvements. Cost about $350,000, of which close to $100,000 will be used for pipe lines.

Seattle has taken bids on 1110 tons of 24 and 30-in., with a centrifugally cast alternate.

San Francisco has awarded 1595 tons of 6 and 8-in. to Central Foundry Co.

Alderwood Manor, Wash., has taken bids on 3696 tons of 4 to 18-in.

Riverside, Cal., has awarded 1000 tons of 4 to 12-in. to United States Pipe & Foundry Co.

McNeil Island, Wash., penitentiary warden has taken bids on 210 tons of 8 to 18-in.

Reinforcing Steel

Awards 7400 Tons—New Projects 3300 Tons

Brooklyn, 1000 tons, bottling plant for F. & M. Schaefer Brewing Co., to Jones & Laughlin Steel Corpn.; Turner-Rostock Corpn., New York, general contractor.

Sayre, Pa., 235 tons, hospital, to Kalman Steel Corpn.

Wassaic, N. Y., 125 tons, state school buildings, to Milton Mfg. Co., Philadelphia, through W. E. Wark Co.

Yorktown, Va., 300 tons, bridge; bids to be opened July 21.

State of Indiana, 700 tons, road work, to four bidders.

State of Illinois, 100 tons, road slabs, to unnamed bidders.

Los Angeles, 170 tons, Griffith Park planetarium, to Pacific Coast Steel Corpn.

Los Angeles, 248 tons, San Gabriel Dam diversion tunnel, to Concrete Engineering Co.

Los Angeles, 300 tons, Walker loft building, to Soule Steel Co.

Los Angeles, 200 tons, San Gabriel dam No. 1 road, to Pacific Coast Steel Corpn.

Los Angeles, 500 tons, Southern California Brewery Co., to Pacific Coast Steel Corpn.

Milwaukee, 3000 tons, sewage plant, to an unnamed bidder.

Vernon, Cal., 200 tons, Rex brewery, to Truscon Steel Co.

San Marino, Cal., 150 tons, residence, to Pacific Coast Steel Corpn.

Catalina Island, Cal., 150 tons, Wrigley memorial, to Pacific Coast Steel Corpn.

NEW REINFORCING BAR PROJECTS

State of Connecticut, 200 tons, highway projects.

Boston, 300 tons, city hospital kitchen building; John Bowen Co., Boston, low bidder.

State of Ohio, 1000 tons, miscellaneous road and bridge projects; bids July 28, Department of Highways, Columbus.

State of Indiana, 1000 tons, road work; bids about Aug. 1.

State of Michigan, 400 tons, six highway bridges; bids to be opened July 27.

St. Louis, 300 tons, administration building negro hospital; Murch Brothers Construction Co., St. Louis, general contractor.

San Diego County, Cal., 100 tons, State highway paving; bids Aug. 2.

Copper Firm at 9c. on Moderate Buying and Heavy Releases

Tin Nominal Pending Possible Release of International Pool Stocks; Zinc Up $3 a Ton as Ore Market Stiffens

NEW YORK, July 18.—Despite an active demand for metal the domestic copper market is unchanged at 9c. a lb., delivered Connecticut. Sellers are receiving heavier specifications than at any time during the past three years. Many fabricators are anticipating requirements, and several large releases have been made against contracts that have been on company books for several years. During June a 37,000-ton reduction was made in copper stocks. It is known that shipments by fabricators to ultimate consumers are far in excess of stock purchases. This unbalanced movement is building up a potential demand for electrolytic which may be reflected in higher price levels in the near future. Small tonnages of float metal were released at 8.92½c. abroad, but failed to reduce general Continental values below 9c., c.i.f., European ports. European inquiry is heavy, with all countries actively taking metal. Because of the brighter market outlook, the Copper Queen branch of Phelps Dodge Corpn. has stepped up monthly smelter operations from 1500 tons to 3000 tons. Other producers do not expect an increase in operating rates at present.

Tin

As sterling rose to $4.84 this morning spot Straits was again quoted at the year's high level of 48c. a lb., New York. For the past two weeks prices have been practically nominal and entirely dependent upon sterling fluctuations. English refined is being ignored and remains nominal at a ¾c. a lb. differential. Domestic buyers are moderately covered for August and show no desire to make commitments until the International Tin Pool announces its policy relative to liquidating 21,000 tons of stock. Present price levels permit a monthly reduction of 420 tons under the Byrne plan. Liquidation has not yet started, however, and domestic buyers are withholding purchases in anticipation of lower prices if full releases are made by the pool. London prices have scored sharp advances, and offerings were made today at £215 7s. 6d. a ton for spot standard, £215 5s. for future standard, and £220 10s. for spot Straits. A somewhat smaller increase was evidenced by the Singapore market, which is currently quoted at £217 15s. a ton. Deliveries of Straits into American consumption totaled 2856 tons during the first half of July. United Kingdom warehouse stocks fell 508 tons last week to 20,488 tons.

Lead

Although large-lot covering has disappeared a regular flow of day-to-day buying has kept this market steady. Prices have been well maintained at recently advanced levels and are unchanged at 4.50c. a lb., New York, and 4.35c., St. Louis. Interest in lead has narrowed perceptibly, and current bookings are chiefly for manufacturers of consumer goods. Although the present statistical position of lead is well balanced as a result of expanding consumption and curtailed production, the effect of this favorable situation has not yet been fully reflected in prices when comparisons are made with upswings in other metal prices. The recent movement in American lead prices, however, is considered to have been retarded by the unfavorable position of the industry abroad. In England, particularly, demand has not yet caught up with production, and the resultant sluggishness of prices there is said to have depressed American lead values.

Zinc

Prime western was advanced $3 a ton during the past seven-day period to 5.37c. a lb., New York, or 5c., East St. Louis. This rise was influenced primarily by an increasingly stringent situation in the zinc ore market. Smelters are experiencing extreme difficulty in obtaining much ore at $35 a ton, and have consequently been forced to adjust their quotations on metal to offset mounting conversion costs. Offerings of zinc are being absorbed rather quickly. The readiness of buyers to cover has imparted further strength to prices, which are firmly established for delivery through September. Ore production in the Joplin field last week was 4900 tons, against sales of 4750 tons. Shipments of ore in the period totaled 2850 tons.

The Corrigan, McKinney Steel Co., Otis Steel Co. and Interlake Iron Corpn. have announced 15 per cent wage increases.

The Week's Prices. Cents Per Pound for Early Delivery

	July 12	July 13	July 14	July 15	July 17	July 18
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, New York	9.00	9.00	9.00	9.00	9.00	9.00
Straits tin, Spot, N. Y.	47.25	46.75	46.75	....	46.75	48.00
Zinc, East St. Louis	4.85	4.85	4.90	4.95	5.00	5.00
Zinc, New York	5.22	5.22	5.30	5.30	5.37	5.37
Lead, St. Louis	4.35	4.35	4.35	4.35	4.35	4.35
Lead, New York	4.50	4.50	4.50	4.50	4.50	4.50

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.

Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.

Antimony, 7.50c. a lb., New York.

Brass ingots, 85-5-5-5, 9c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	50.00c. to 51.00c.
Tin, bar	52.00c. to 53.00c.
Copper, Lake	10.50c. to 11.25c.
Copper, electrolytic	10.25c. to 10.75c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	15.62½c.
*High brass sheets	14.25c.
*Seamless brass tubes	15.87½c.
*Seamless copper tubes	16.12½c.
*Brass rods	11.75c.
Zinc, slabs	6.25c to 7.25c.
Zinc sheets (No. 9), casks	9.75c. to 10.00c.
Lead, American pig	5.50c. to 6.50c.
Lead, bar	7.00c. to 8.00c.
Lead, sheets	8.25c.
Antimony, Asiatic	8.50c. to 9.50c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.	18.00c. to 19.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal commerical grade	27.00c. to 52.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	49.50c.
Tin, bar	51.50c.
Copper, Lake	10.25c.
Copper, electrolytic	10.25c.
Copper, casting	10.00c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.35 ½c. to 5.50c.
Lead, bar	8.50c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	53.50c.
Solder, ½ and ½	27.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.25c.	8.00c.
Copper, hvy. and wire	7.25c.	8.00c.
Copper, light and bottoms	6.00c.	6.75c.
Brass, heavy	4.00c.	4.75c.
Brass, light	3.50c.	4.00c.
Hvy. machine composition	5.75c.	6.25c.
No. 1 yel. brass turnings	4.75c.	5.375c.
No. 1 red brass or compos. turnings	5.25c.	5.875c.
Lead, heavy	3.625c.	4.00c.
Zinc	2.75c.	3.25c.
Cast aluminum	7.00c.	8.25c.
Sheet aluminum	12.00c.	13.50c.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.91c.
Del'd New York	1.95c.
Del'd Detroit	1.80c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.70c.
F.o.b. Birmingham	1.75c.
C.i.f. Pacific ports	2.10c.

Billet Steel Reinforcing

(Cut lengths as quoted by distributers)

F.o.b. P'gh mills	1.75c.
F.o.b. Birmingham	1.75c.
F.o.b. Cleveland	1.75c. to 1.90c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.50c.
F.o.b. Chicago Heights mills	1.50c.

Iron

Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.4935c. to 1.5935c.
F.o.b. Coatesville	1.40c. to 1.50c.
F.o.b. Sparrows Point	1.40c. to 1.50c.
Del'd New York	1.598c. to 1.698c.
C.i.f. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
F.o.b. Lackawanna	1.70c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.86775c.
C.i.f. Pacific ports (standard)	2.10c.
C.i.f. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.05c.
F.o.b. Buffalo	2.00c.

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)

Alloy Quantity Bar Base, 2.45c. to 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2000 (1½% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Square	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finish alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2¼ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh Mill	1.70c.
Bars, f.o.b. Chicago	1.75c.
Bars, Cleveland	1.75c.
Bars, Buffalo	1.75c.
Bars, Detroit	1.90c.
Bars, eastern Michigan	1.95c.
Shafting, ground, f.o.b. mill, 1⅛ in.	3.00c.
1-3/16 to 1¼ in.	2.50c.
1-9/16 to 1⅞ in.	2.35c.
1-15/16 to 2¾ in.	2.20c.
2-15/16 to 6 in.	2.05c.

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.65c.
No. 10, f.o.b. Chicago mill	1.75c.
No. 10, del'd Philadelphia	1.96c.
No. 10, f.o.b. Birmingham	1.80c.
No. 10, c.i.f. Pacific Coast ports	2.27½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c
No. 24, f.o.b. Chicago mills	2.35c.
No. 24, del'd Philadelphia	2.56c.
No. 24, f.o.b Birmingham	2.40c.
No. 24, c.i.f. Pacific Coast ports	2.90c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled (Mill Run)

No. 10 gage, f.o.b. Pitts'h	1.95c.
No. 10 gage, f.o.b. Chicago mills	2.05c.
No. 10 gage, del'd Phila.	2.26c.
No. 10 gage, del'd Pacific Coast ports	2.70c.

Light Cold-Rolled (Mill Run)

No. 20 gage, f.o.b. Pitts'h	2.40c.
No. 20 gage, f.o.b. Chicago mills	2.50c.
No. 20 gage, del'd Phila.	2.56c.
No. 20 gage, del'd Pacific Coast ports	2.95c.

Auto Body and Steel Furniture

No. 10, f.o.b. Pittsburgh	2.15c.
No. 20 f.o.b. Pittsburgh	2.60c.
No. 20, f.o.b. Chicago	2.70c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago mills	2.95c.
No. 24, del'd Philadelphia	3.16c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, c.i.f. Pacific Coast ports	3.50c.
No. 24, wrought iron, Pittsburgh	4.95c

Long Terne

No. 24, unassorted, 8-lb. coating f.o.b. Pittsburgh	2.90c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.50c.
No. 28, Chicago mill	2.60c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8 lb. coating I.C.	$8.70
15-lb. coating I.C.	11.00
20-lb. coating I.C.	11.90
25-lb. coating I.C.	13.00
30-lb. coating I.C.	13.80
40-lb. coating I.C.	15.30

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.60c. to 1.65c.
All widths up to 24 in., Chicago	1.70c. to 1.75c.
Cooperage stock, P'gh	1.70c. to 1.75c.
Cooperage stock, Chicago	1.80c. to 1.85c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.25c.
F.o.b. Cleveland	2.25c
Del'd Chicago	2.55c.
F.o.b. Worcester	2.45c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.10c.
Spring wire	3.10c.

To Jobbing Trade

Extras of 10c. a 100 lb. on mixed carloads, 20c. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

	Base per Keg
Standard wire nails	$2.10
Smooth coated nails	2.10
Galvanized nails	3.60
	Base per 100 Lb.
Smooth annealed wire	$2.25
Smooth galvanized wire	2.60
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Woven wire fence, base column	$55.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

Butt Weld

Steel Inches	Black	Galv.	Wrought Iron Inches	Black	Galv.
⅛	51½	29½	⅛	+91¼	+138
¼ to ⅜	57	38½	¼ & ⅜	+1½	+21½
½	62	50½	½	31½	15
⅝	65½	55½	¾	36½	20¼
1 to 3	67½	58½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	63¼	54½	2	37	22½
2½ to 3	66½	57½	2½ to 3½	38	25
3½ to 6	68½	59½	4 to 8	40	28½
7 and 8	57½	57	9 to 12	38	24½
9 and 10	67	57			
11 and 12	66	56			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	54¼	41½	¼ & ⅜	+2½	+34½
½	60	51	½	32½	17½
¾	64½	55½	¾	37½	22½
1 to 3	66½	58½	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	61½	53½	2	40	26
2½ to 3	65½	57½	2½ to 4.45	½	33
3½ to 6	69	61	4½ to 6.45		32½
7 to 8	68	58	7 & 8	46	33
9 and 10	67	57	9 to 12	41½	30
11 and 12	66	56			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—4¼ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 8 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	61	3 in.	41
1¼ to 1½ in.	53	3¼ to 3½ in.	44
1¾ in.	37	4 in.	46
2 to 2¼ in.	27	4½ to 6 in.	36
2½ to 2¾ in.	34		

Hot Rolled

2 and 2¼ in.	33	3¼ to 3½ in.	50
2½ and 2¾ in.	40	4 in.	52
3 in.	47	4½ to 6 in.	42

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel), f.o.b. mill	26.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, ½-in. and smaller	2.40
Spikes, boat and barge	2.60
Tie plates, steel	1.75
Angle bars	2.55
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, (per 100 count)	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	73
Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex nuts, blank or tapped	73
Semi-finished hexagon nuts	73
Semi-finished hexagon castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh, 72½, 25 and 10	
Stove bolts in packages, Ch'go, 72½, 25 and 10	
Stove bolts in packages, Cleveland, 72½, 25 and 10	
Stove bolts in bulk, P'gh	85
Stove bolts in bulk, Chicago	85
Stove bolts in bulk, Cleveland	85
Tire bolts	60

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.50
F.o.b. Chicago	2.60

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chi'o and Birm'g'm	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	85
Milled standard set screws, case hardened, 1 in. dia. and smaller	80
Milled headless set screws, cut thread ¾ in. and smaller	75 and 10
Upset hex. head cap screws, U.S.S.S or S.A.E. thread, 1 in. dia. and smaller	85 and 10
Upset set screws, sq. head	80
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. to 6-in. inclusive Pittsburgh	$26.00
Rerolling, 4-in. to 6-in. inclusive Youngstown	26.00
Rerolling, 4-in. to 6-in. inclusive Cleveland	26.00
Rerolling, 4-in. to 6-in. inclusive Chicago	26.00
Forging quality, Pittsburgh	31.00
Forging quality, Youngstown	31.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

Slabs

(3 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

(Turn to next page)

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$2.50 to $3.50
Foundry, f.o.b. Connellsville Prompt	3.00 to 4.00
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.50
Foundry, by-product, delivered in Chicago switching district	8.25
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland, delivered	8.26
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.10 to $1.20
Mine run coking coal f.o.b. W. Pa.	1.40 to 1.50
Gas coal, ¾-in., f.o.b. Pa. mines	1.30 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.30 to 1.40
Steam slack, f.o.b. W. Pa. mines	0.45 to 0.55
Gas slack, f.o.b. W. Pa. mines	0.65 to 0.75

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.23c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.00c.
No. 4 industrial	4.75c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$40.00	$35.00
Maryland	40.00	35.00
New Jersey	50.00	38.00
Ohio	40.00	35.00
Kentucky	40.00	35.00
Missouri	40.00	35.00
Illinois	40.00	35.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00
Chicago	49.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$43.40 to $44.40
4-in., del'd Chicago	46.40 to 47.40
6-in., and larger, del'd New York	38.30
4-in., del'd New York	41.30
6-in., and larger, Birmingham,	$35.00 to 36.00
4-in., Birmingham	38.00 to 39.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per Gross ton f.o.b. Valley furnace:

Basic	$16.00
Bessemer	17.00
Gray forge	16.50
No. 2 foundry	16.50
No. 3 foundry	16.00
Malleable	16.50
Low phos., copper free	25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.00
Bessemer	17.50

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnaces:

N'th'n No. 2 fdy.	$17.00
N'th'n No. 1 fdy.	17.50
Malleable, not over 2.25 sil.	17.00
High phosphorus	17.00
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	$16.14 to 17.14
Low. phos., sil. 1 to 2, Copper free.	25.00
Silvery, sil. 8 per cent	24.92
Bess. ferrosil'n, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorous and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.00
Del'd St. Louis	17.85
Malleable, f.o.b. Granite City	17.50
Southern fdy., sil. 1.75 to 2.25 del'd St. Louis	17.35

Freight rates, 83c (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per Gross ton, delivered New York district:

*Buffalo, No. 2, del'd Eastern N. J.	$18.41
Buffalo malleable, del'v'd Eastern N. J.	18.91
East Pa. No. 2 fdy.	18.02
East Pa. No. 2X fdy.	18.52

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

*No. 2 fdy.	$17.00
Malleable, sil. up to 2.25	17.50
Basic	15.00
Lake Superior charcoal, del'd	23.41

*Each increase of 25 points of silicon above base foundry grade takes 25c. extra.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$17.51
Tenn. fdy., sil. 1.75 to 2.25	17.51
N'th'n No. 2 foundry	$18.01 to 19.40
S'th'n Ohio silvery, 8%	21.39

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy.	$16.50
Malleable	16.50
Ohio silvery, 8 per cent	24.00
Stand. low. phos., Valley	25.00
Southern No. 2 fdy.	17.14

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates; 63c. average local switching charge; $3.00 from Jackson, Ohio; $6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

*East. Pa. No. 2	$17.34
Basic (del'd east Pa.)	17.09
Malleable	17.84
Stand. low phos. (f.o.b. east. Pa. furnace)	$22.00 to $23.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.
*Each increase of 25 points of silicon above base grade takes 25c. extra.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$13.00
Basic	13.00

NEW ENGLAND

Per gross ton delivered Boston and nearby New England points:

Buffalo, sil. 1.75 to 2.25	$18.53 to $19.04
Buffalo, sil. 2.25 to 2.75	18.53 to 19.04
Ala., sil. 1.75 to 2.25	18.00 to 18.50

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carloads)	$82.00
Domestic, 80%, seaboard, (less carloads)	89.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Silvery Iron

F.o.b. Jackson County, Ohio, or Pittsburgh Furnace

Per Gross Ton		Per Gross Ton	
6%	$19.00	12%	$22.00
7%	19.50	13%	22.50
8%	20.00	14%	23.00
9%	20.50	15%	23.50
10%	21.00	16%	24.00
11%	21.50		

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, or Pittsburgh Furnace

Per Gross Ton		Per Gross Ton	
10%	$21.50	14%	$23.50
11%	22.00	15%	24.00
12%	22.50	16%	24.50
13%	23.00		

Manganese 1½ to 3%. $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.65% or over, $1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	9.50c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained Va.	$2.60 to 2.80
Ferrocarbontitanium, 15 to 18% per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorous, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorous, 51.50% iron	1.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	7.50c.
Iron, low phos., Swedish, average 68½% iron	8c.
Iron, basic or foundry, Swedish, average, 65% iron	8c.
Iron, basic or foundry, Russian, aver. 65% iron (nom.)	8c.
Manganese, Caucasian, washed 52%	20c.
Manganese, African, Indian, 50-52%	18c.
Manganese, Brazilian, 46 to 48%	16c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid*	$12.00
Tungsten, domestic scheelite*	$11.00 to $12.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	16.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic seaboard	18.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	$14.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	16.75
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$13.00 to $13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 2 railroad wrought	13.00 to 13.50
Scrap rails	13.00 to 13.50
Rails 3 ft. and under	14.00 to 14.50
Sheet bar crops, ordinary	14.00 to 14.50
Compressed sheet steel	12.50 to 13.00
Hand bundled sheet steel	11.00 to 11.50
Hvy. steel axle turnings	11.50 to 12.00
Machine shop turnings	10.50 to 11.00
Short shov. steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	10.00 to 10.50
Cast iron carwheels	12.50 to 13.00
Heavy breakable cast	9.50 to 10.50
No. 1 cast	11.00 to 11.50
Railr. knuckles and couplers	14.00 to 14.50
Rail, coil and leaf springs	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Low phos. billet crops	16.00 to 16.50
Low phos. sheet bar crops	14.50 to 15.00
Low phos. plate scrap	14.50 to 15.00
Low phos. punchings	14.50 to 15.00
Steel car axles	14.00 to 14.50

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton	
Heavy melting steel	$10.50 to $11.00
Shoveling steel	10.50 to 11.00
Hydraulic comp. sheets	$9.00 to $9.50
Drop forge flashings	8.50 to 9.00
No. 1 busheling	9.25 to 9.75
Rolled carwheels	11.75 to 12.25
Railroad tires	11.50 to 12.50
Railroad leaf springs	11.50 to 12.00
Axle turnings	8.50 to 9.00
Steel couplers and knuckles	11.00 to 11.50
Coil springs	11.75 to 12.25
Axle turnings (elec. fur.)	8.50 to 9.00
Low phos. punchings	12.00 to 12.50
Low phos. plates, 12 in. and under	12.00 to 12.50
Cast iron borings	6.50 to 7.00
Short shoveling turnings	6.50 to 7.00
Machine shop turnings	6.00 to 6.50
Rerolling rails	12.00 to 12.50
Steel rails, less than 3 ft.	11.75 to 12.25
Steel rails, less than 2 ft.	12.00 to 12.50
Angle bars steel	11.50 to 12.00
Cast iron carwheels	10.50 to 11.00
Railroad malleable	10.50 to 11.00
Agricultural malleable	8.50 to 9.00

	Per Net Ton
Iron car axles	$12.50 to $13.00
Steel car axles	11.50 to 12.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	9.00 to 9.50

No. 2 busheling	$4.00 to	$4.50
Locomotive tires, smooth	9.00 to	9.50
Pipe and flues	4.75 to	5.25
No. 1 machinery cast	10.50 to	11.00
Clean automobile cast	10.00 to	10.50
No. 1 railroad cast	10.00 to	10.50
No. 1 agricultural cast	8.75 to	9.25
Stove plate	7.75 to	8.25
Grate bars	6.75 to	7.25
Brake shoes	9.75 to	10.25

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.50 to	$11.00
No. 2 heavy melting steel	9.50 to	10.00
No. 1 railroad wrought	....	11.00
Bundled sheets	4.00 to	4.50
Hydraulic compressed, new	....	6.00
Hydraulic compressed, old	....	5.00
Machine shop turnings	7.00 to	7.50
Heavy axle turnings	7.50 to	8.00
Cast borings	....	7.00
Heavy breakable cast	10.00 to	10.50
Stove plate (steel works)	....	8.00
No. 1 low phos. heavy	13.00 to	13.50
Couplers and knuckles	11.00 to	11.50
Rolled steel wheels	11.00 to	11.50
No. 1 blast furnace	....	7.00
Spec. iron and steel pipe	8.00 to	8.50
Shafting	13.00 to	13.50
Steel Axles	13.00 to	13.50
No. 1 forge fire	8.00 to	8.50
Cast iron carwheels	12.50 to	13.00
No. 1 cast	12.00 to	12.50
Cast borings (chem.)	10.00 to	10.50
Steel rails for rolling	11.00 to	11.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00 to	$10.50
No. 2 heavy melting steel	9.50 to	10.00
Compressed sheet steel	9.00 to	9.50
Light bundled sheet stampings	6.50 to	7.00
Drop forge flashings	9.50 to	10.00
Machine shop turnings	7.25 to	7.50
Short shoveling turnings	7.75 to	8.00
No. 1 busheling	9.50 to	10.00
Steel axle turnings	7.50 to	8.00
Low phos. billet crops	12.00 to	12.50
Cast iron borings	7.75 to	8.00
Mixed borings and short turnings	7.75 to	8.00
No. 2 busheling	7.50 to	7.75
No. 1 cast	10.50 to	11.00
Railroad grate bars	6.50 to	7.00
Stove plate	7.50 to	8.00
Rails under 3 ft.	10.00 to	10.50
Rails for rolling	10.50 to	11.00
Railroad malleable	10.00 to	10.50
Cast iron carwheels	....	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$10.50 to	$11.00
No. 2 heavy melting scrap	9.75 to	10.25
Scrap rails	8.75 to	9.25
New hydraul. comp. sheets	9.75 to	10.25
Old hydraul. comp. sheets	9.25 to	9.75
Drop forge flashings	9.25 to	9.75
No. 1 busheling	8.75 to	9.25
Hvy. steel axle turnings	7.50 to	8.00
Machine shop turnings	6.25 to	6.50
Knuckles and couplers	11.50 to	12.00
Coil and leaf springs	11.50 to	12.00
Rolled steel wheels	11.50 to	12.00
Low phos. billet crops	12.50 to	13.00
Short shov. steel turnings	6.50 to	7.00
Short mixed borings and turnings	6.50 to	7.00
Cast iron borings	6.50 to	7.00
No. 2 busheling	6.00 to	6.50
Steel car axles	11.00 to	12.00
Iron axles	11.00 to	12.00
No. 1 machinery cast	10.75 to	11.25
No. 1 cupola cast	10.50 to	11.00
Stove plate	8.00 to	8.50
Steel rails, 3 ft. and under	12.00 to	12.50
Cast iron carwheels	9.00 to	9.50
Industrial malleable	11.50 to	12.00
Railroad malleable	11.50 to	12.00
Chemical borings	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	....	$10.00
Scrap steel rails	$9.00 to	9.50
Short shoveling turnings	4.50 to	5.00
Stove plate	6.50 to	7.00
Steel axles	11.00 to	11.50
Iron axles	....	11.00
No. 1 railroad wrought	7.00 to	7.50
Rails for rolling	....	10.50
No. 1 cast	....	10.00
Tramcar wheels	....	10.00
Cast iron borings, chem.	....	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$9.50 to	$10.00
No. 1 heavy melting	8.50 to	9.00
No. 2 heavy melting	8.00 to	8.50
No. 1 locomotive tires	7.00 to	7.50
Misc. stand.-sec. rails	10.00 to	10.50
Railroad springs	9.50 to	10.00
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	8.50 to	9.00
No. 1 busheling	3.50 to	4.00
Cast iron borings and shoveling turnings	3.00 to	3.50
Rails for rolling	10.50 to	11.00
Machine shop turnings	3.00 to	3.50
Heavy turnings	4.00 to	4.50
Steel car axles	10.00 to	10.50
Iron car axles	11.00 to	11.50
Wrot. iron bars and trans.	8.50 to	9.00
No. 1 railroad wrought	6.00 to	6.50
Steel rails less than 3 ft.	11.50 to	12.00
Steel angle bars	10.00 to	10.50
Cast iron carwheels	8.50 to	9.00
No. 1 machinery cast	8.00 to	8.50
Railroad malleable	8.00 to	8.50
No. 1 railroad cast	8.00 to	8.50
Stove plate	7.00 to	7.50
Relay rails, 60 lb. and under	16.00 to	16.50
Relay rails, 60 lb. and over	$20.00 to	$21.00
Agricult. malleable	6.00 to	6.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$6.00 to	$6.25
Scrap T rails	6.00 to	6.25
Machine shop turnings	3.75 to	4.25
Cast iron borings	3.75 to	4.00
Bundled skeleton long	4.50 to	5.00
Forge flashings	4.50 to	5.00
Blast furnace scrap	3.75 to	4.25
Shafting	9.00 to	9.50
Steel car axles	8.50 to	9.00
Wrought pipe	2.50 to	3.00
Rails for rerolling	6.00 to	6.50
Cast iron borings, chemical	8.50 to	9.00

Per gross ton delivered consumers' yards:

Textile cast	$8.50 to	$9.00
No. 1 machinery cast	8.50 to	9.00
Stove plate	4.50 to	4.75
Railroad malleable	11.00 to	12.00

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.50 to	$8.00
No. 2 heavy melting steel	5.25 to	6.50
Heavy melting steel (yard)	2.50 to	3.00
No. 1 heavy breakable cast	6.50 to	6.75
Stove plate (steel works)	5.25 to	6.00
Machine shop turnings	4.00 to	4.50
Short shoveling turnings	4.00 to	4.50
Cast borings	4.00 to	4.25
No. 1 blast furnace	4.00 to	4.25
Steel car axles	10.00 to	10.50
Spec. iron and steel pipe	$3.50 to	$4.00
Forge fire	5.00 to	5.25
No. 1 railroad wrought	5.00 to	5.50
No. 1 yard wrought long	3.50 to	3.75
Rails for rolling	7.00 to	7.25
No. 1 cast	6.50 to	7.00
No. 2 cast	5.50 to	6.50
Stove plate (foundry)	5.50 to	6.00
Cast borings (chemical)	6.50 to	7.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	$10.00
No. 1 hvy. cast (cupola size)	9.00
No 2 cast	7.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$9.00 to	$9.50
Scrap rails for melting	9.00 to	9.50
Loose sheet clippings	4.50 to	5.00
Bundled sheets	5.50 to	6.00
Cast iron borings	6.00 to	6.50
Machine shop turnings	5.50 to	6.00
No. 1 busheling	6.50 to	7.00
No. 2 busheling	3.00 to	3.50
Rails for rolling	9.50 to	10.00
No. 1 locomotive tires	8.00 to	8.50
Short rails	11.00 to	11.50
Cast iron carwheels	8.50 to	9.00
No. 1 machinery cast	9.50 to	10.00
No. 1 railroad cast	9.00 to	9.50
Burnt cast	6.00 to	6.50
Stove plate	6.00 to	6.50
Agricultural malleable	8.00 to	8.50
Railroad malleable	8.50 to	9.00

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$9.00 to	$9.50
Borings and short turnings	6.50 to	7.00
Long turnings	5.75 to	6.25
No. 1 machinery cast	8.00 to	8.50
Automotive cast	10.00 to	10.50
Hydraul. comp. sheets	9.00 to	9.50
Stove plate	5.00 to	5.50
New No. 1 busheling	7.50 to	8.00
Old No. 2 busheling	5.50 to	6.00
Sheet clippings	6.00 to	6.50
Flashings	7.00 to	7.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$4.50	$4.50
Rails, scrap	4.50	4.50
Machine shop turnings	2.00	2.00
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	2.95c.
Hoops and bands, under ¼ in.	2.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.10c.
Galv. sheets (No. 24), 25 or more bundles	3.60c.
Hot-rolled sheets (No. 10)	2.60c. to 2.90c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.61
Spikes, large	2.40c.
Small	2.65c.
Boat	2.90c.
Track bolts, all sizes, per 100 count,	70 per cent off list.
Machine bolts, 100 count,	70 per cent off list.
Carriage bolts, 100 count,	70 per cent off list.
Nuts, all styles, 100 count,	70 per cent off list.
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	3.10
Common wire nails, per keg	2.20
Cement coated nails, per kg.	2.20

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforc. bars, billet steel	1.75c. to 1.90c.
Rail steel reinforcement	1.50c. to 1.65c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.00c.
Flats and squares	3.50c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.45c.
Galv. sheets (No. 24)	3.85c.
Hot-rolled sheets (No. 10)	2.75c.
Spikes (3/16 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural (keg. lots)	2.75c.
Rivets, boiler (keg lots)	2.75c.
	Per Cent Off List
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq., tap. or blank.	65
Hot-pressed nuts, hex., tap. or blank.	65
Hex. head cap screws	80 and 10
Cup point set screws	75
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.45
Com. wire nails, base per keg	2.45
Cement c't'd nails, base per keg	2.45

NEW YORK

	Base per lb.
Plates and struc. shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, swed. charcoal	5.75c. to 6.25c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.54c.
Flats and squares	4.04c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.30c.
Bands	3.30c.
Hot-rolled sheets (No. 10)	3.00c.
Hot-rolled ann'l'd sheets (No. 24*)	3.65c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ½ x ⅛ in. and larger; Smooth finish. 1 to 2½ x ¼ in. and larger	3.40c. 3.75c.
Open hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.65
	Per Cent
Machine bolt, cut thread:	Off List
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.36c.
Hot-rolled annealed sheets (No. 24)	3.60c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.00c.
Black corrug. sheets (No. 24)	3.65c.
Galv. corrug. sheets	4.05c.
Structural rivets	3.00c.
Boiler rivets	3.00c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller. 100 lb. or more	70
Less than 100 lb.	70
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq. blank or tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.45c.
*Structural shapes	2.45c.
*Soft steel bears, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-finished steel bars	3.35c.
*Steel hoops	3.00c.
*Steel bands, No. 12 to 3/16 in., incl.	2.75c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No 24)	3.15c.
†Galvanized sheets (No. 24)	3.50c.
*Hot-rolled annealed sheets (No. 10)	2.70c.
Diam. pat. floor plates, ¼ in.	5.00c.
Swedish iron bars	6.00c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deductions on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 2.35c.
Cold-fin. steel bars	2.95c.
Flat rolled steel under ¼ in.	3.00c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.85c.
Hot-rolled sheets (No. 10)	2.75c.
Black ann'l'd wire, per 100 lb.	$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.75c.
Bands	3.20c.
Cold-finished bars	3.32c.
Hot-rolled annealed sheets (No. 24)	3.60c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.05c.
Structural rivets	4.00c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chair, 1-in., per 100 lb.	6.00
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$15.87
4-in.	34.57
Lap-welded steel boiler tubes, 2-in.	15.12
4-in.	32.96

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.20c.
Soft steel bars	2.95c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.00c.
Rounds and hex.	3.00c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.35c.
Galv. sheets (No. 24)	3.75c.
Bands	3.30c.
Hoops	3.55c.
Hot-rolled sheets (No. 10) 48-in. and narrower	3.00c.
Wider than 48-in.	3.25c.
Com. wire nails, base per keg	$2.40
Black wire, base per 100 lb.	3.35

BOSTON

	Per Lb.
*Beams, channels, angles, tees, zees	2.60c.
*H beams and shapes	2.60c.
*Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	2.60c.
*Floor plates, diamond pattern	4.50c.
*Bar and bar shapes (mild steel)	2.50c.
*Bands 3/16 in. thick and No. 12 ga. incl.	3.50c.
Hoops, No. 14 ga. and lighter	4.90c. to 5.40c.
*Half rounds, half ovals, ovals and bevels	3.75c.
Tire steel, rd. edge 1½ x ½ in. and larger	4.50c.
Smaller sizes	4.75c.
Cold-finished rounds and hexagons	3.60c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.10c.
*Blue annealed sheets, No. 10 ga.	2.45c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Blued stove pipe sheets, No. 24 ga.	3.90c.
Galvanized steel sheets No. 24 ga.	4.00c.
Lead coated (long terne) No. 24 ga.	5.00c.
Black wire, base per 100 lb., 2500 lb. or less	3.35c.
Over 2500 lb.	3.25c.

Base prices for 40,000 lb. orders; extras apply for smaller quantities.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	2.80c.	3.30c.	3.00c.
Shapes, standard	3.15c.	3.30c.	3.00c.
Wide-flanged beams and columns	3.25c.	3.30c.	3.50c.
Soft steel bars	3.15c.	3.30c.	3.00c.
*Reinforcing bars	3.00c.	3.00c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.95c.	4.20c.	4.25c.
Hot-rolled sheets (No. 10)	3.33c.	3.80c.	3.50c.
Galv. sheets (No. 24)	4.55c.	4.50c.	4.00c.
*Struc. rivets, ½ in. and larger	5.75c.	6.00c.	5.25c.
*Cold finished steel Rounds	5.50c.	5.50c.	5.50c.
Squares and hexagons	6.75c.	6.75c.	6.75c.
Flats	7.25c.	7.25c.	7.25c.
Common wire nails —base per keg	$2.65	$2.55	$2.70
less carload			

*Subject to deductions for quantity.

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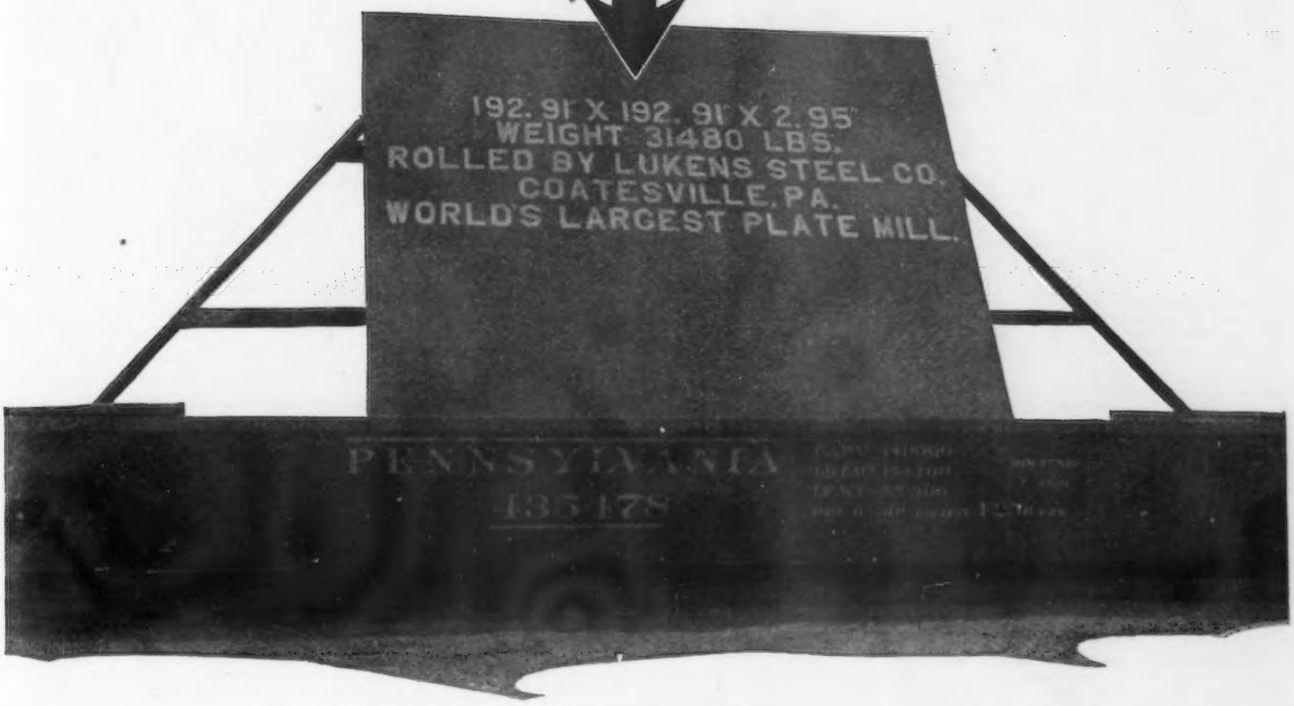

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NEW ENGLAND

Union River Machine Co., Ellsworth, Me., recently organized to operate a boat-building, boat repair and general machine works, has acquired former local property of Curtis Shipyard, heretofore held by Ellsworth Machine Co., and will remodel for new plant.

Connecticut Brewery Co., Housatonic Avenue, Bridgeport, Conn., has plans for extensions and improvements, including equipment. Cost over $50,000 with machinery. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, is architect and engineer.

International Automatic Coupling, Inc., Boston, has been organized by A. L. Reed, 38 Pearl Street, Leominster, Mass., and associates, to manufacture couplings and kindred products.

Hartford Brewing Co., Hartford, Conn., H. L. Pierce, 650 Main Street, president, has let general contract to F. L. Rice, 50 Trumbull Street, for remodeling two buildings on Pope Park Road, recently acquired for new brewery. Plans are under way for one-story addition, 75 x 140 ft., for bottling works. Entire project will cost about $500,000 with equipment. Ebbets & Frid, 15 Lewis Street, are architects.

Apex Tool & Cutter Co., Inc., Shelton, Conn., has been organized, capital $50,000, by A. M. Docken, Sunnyside, N. Y., to manufacture tools and other equipment.

Water Supply Board, City Hall, Salem, Mass., plans installation of pumping machinery and other equipment for new water supply and filtration plant. Cost about $1,000,000. Financing is being arranged. Metcalf & Eddy, Statler Building, Boston, are consulting engineers.

NORTH ATLANTIC

Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., 120 Broadway, New York, manufacturer of mechanical rubber goods, has let general contract to Austin Co., Philadelphia, for one-story addition to mill at Passaic, N. J. Cost about $30,000 with equipment.

Southern Kraft Corpn., 220 East Forty-second Street, New York, manufacturer of kraft wrapping papers, etc., with mills at Mobile, Ala., Camden, Ark., and other points, has purchased plant of Robert Gair Corpn., 155 East Forty-fourth Street, New York, at Quincy, Ill., recently vacated, and will use for new kraft paper mill. Company is a subsidiary of International Paper Co.

Concrete Vibrator Corpn., New York, has been organized by Gregory F. Noonan, 3875 Waldo Avenue, New York, and Peter J. Donoghue, 37-17 Ninety-eighth Street, Corona, L. I., to manufacture vibratory mechanical equipment for concrete placing.

International Business Machines Corpn., 270 Broadway, New York, manufacturer of duplicating and recording machines, typewriters, etc., with main plant at Endicott, N. Y., has purchased plant and business of Electromatic Typewriters, Inc., 45 Crouch Street, Rochester, N. Y., manufacturer of electric-operated typewriters, parts, etc. Purchasing company will operate as a subsidiary and expand production.

North American Iron & Steel Co., Inc., Brooklyn, has been organized by Nathan Michelman, 1522 East Second Street, and associates, to manufacture iron and steel products.

Greenpoint Trading Corpn., 166 North Fourth Street, Brooklyn, machinery and parts, has filed plans for one-story top addition to plant. Cost about $25,000 with equipment. Benjamin Chester, Chester Architectural Corpn., 26 Court Street, is architect.

Martin Machinery Corpn., New York, has been organized, capital $100,000, by James E. Bennet, Jr., 541 West 141st Street, New York, and Walter A. Peterson, 243 Rushmore Avenue, Douglaston, L. I., to manufacture machinery and parts.

Home Brewing Co., Orange Street, Newark, N. J., will ask bids in 30 to 60 days for extensions and improvements. Cost about $100,000 with equipment. Waldemar Mortensen, 103 Park Avenue, New York, is architect.

Stanley Rule & Level Co., Lake Street, New Britain, Conn., is planning early removal of Atha Division works, 139 Chapel Street, Newark, to main plant at New Britain, where production of chisels, automotive tools, sledges, etc., as manufactured by Atha branch, will be concentrated.

Passaic Metal Products Co., Passaic, N. J., has been organized under direction of William N. Gurtman, 143 Prospect Street, to manufacture iron, steel and other metal products. New company will take over organization of same name at 161 Monro Street.

Barton Smith, Trenton, N. J., has leased large unit of former plant of Monument Pottery Co., West Ingham Avenue, and will remodel for manufacture of writing, tissue and other papers. Two paper-making machines and auxiliary equipment will be installed for initial operations, with other machinery later. Company will be organized to carry out project.

E. I. du Pont deNemours & Co., du Pont Building, Wilmington, Del., have approved expansion at plants at Deepwater Point and Carney's Point, near Penns Grove, N. J., including new lead ethyl unit at first noted place, cost about $400,000 with equipment, and new building to replace structure recently destroyed by fire.

Burton Products, Inc., 83 Straight Street, Paterson, N. J., brewer, has asked bids on general contract for extensions and improvements, including addition for bottling plant. Cost about $45,000 with equipment. Clarence E. Wunder, Architects' Building, Philadelphia, is architect.

Esslinger's, Inc., 417 North Tenth Street, Philadelphia, has let general contract to John A. Robbins, Land Title Building, for addition to brewery. Cost over $30,000 with equipment. Richard R. Neely is company architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 25 for 190 propeller blades and quantity of aircraft hubs (Schedule 362) for Philadelphia and Farmingdale naval stations.

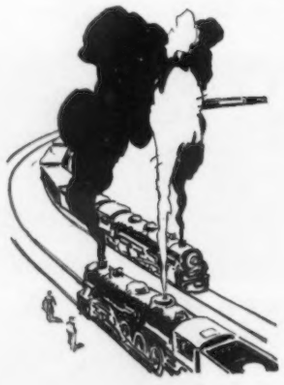
Chemical Products Co., Fort Washington, Pa., has leased plant of Oil Extraction Corpn., comprising group of buildings, 30,000 sq. ft. floor space, on 7-acre tract, for new works for production of industrial chemicals, etc. Equipment will be installed.

D. Wilcox Co., Mechanicsburg, Pa., manufacturer of forgings, has reopened plant after curtailment for several months.

Consolidated Aircraft Corpn., 2050 Elmwood Avenue, Buffalo, manufacturer of airplanes and parts, plans group of one-story buildings, about 300 x 1500 ft., on 20-acre tract at Lindbergh Field, San Diego, Cal., recently leased from city, including machine shops, assembling works, parts shops, power house, hangars and other units. Entire plant will cost over $400,000 with equipment. Company is said to be planning removal of Buffalo and Tonawanda, N. Y., plants to new location, where production will be concentrated.

Elmira Foundry Co., Elmira, N. Y., has increased production to full time six-day-week, with two shifts, day and night, giving employment to about 375 men.

B. W. Howard Corpn., Buffalo, has been organized by Ralph M. Andrews, 30 Norwood Avenue, and Kenneth H. Haller, 1165 Delaware Avenue, to manufacture tools and mechanical equipment.



W. A. Gibbs & Son, Chester, Pa., manufacturers of steel animal and game traps, have purchased plant and business of Triumph Trap Co., Oneida, N. Y., manufacturer of kindred products, and will operate as a subsidiary.

SOUTH ATLANTIC

Constructing Quartermaster, Bolling Field, Washington, will ask bids soon for new Federal shop and hangar unit, cost $242,31[illegible] with equipment; new hangars with shop and repair facilities, $348,000; steam power house for central heating service, $128,000 with equipment; quartermaster equipment warehouse, garage, shops, etc., about $50,000.

Harrington Mfg. Co., Lewiston, N. C., L. G. Harrington, head, manufacturer of hay balers, peanut pickers and other machinery, will establish temporary plant, pending rebuilding of works recently destroyed by fire, and will purchase milling machine and other equipment for immediate use. Reconstruction will begin in fall.

Constructing Quartermaster, Aberdeen Proving Ground, Aberdeen, Md., will ask bids soon for new hangars with repair and reconditioning facilities. Cost $115,000 with equipment. Appropriation authorized.

J. A. Baker, 185 Montana Avenue, Asheville, N. C., has plans for new two-story and basement meat-packing plant, 50 x 75 ft. Cost about $45,000 with equipment. H. Vanderhoof, Asheville, is architect and engineer.

Gulf Refining Co., Hurt Building, Atlanta, Ga., will soon begin erection of new bulk oil storage and distributing plant at Brunswick, Ga. Cost about $35,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 27 for one motor-driven blower, seven pumps, two oil purifiers and other equipment for craneship Atlas (Schedule 2886); until July 28, 10,000 ft. wire rope, 770 ft. spud hoist cable, 15,000 lb. soft steel wire, 50,500 lb. wire nails, 3000 lb. galvanized roofing nails, 5000 lb. finishing nails, 20,000 lb. sheet steel, 4200 ft. brass pipe, 1100 condenser tubes, 800 ft. copper pipe, etc. (Schedule 2887).

Moore Lime Co., Eagle Rock, Va., has been acquired by new interests, headed by Maurice D. Langhorne, 336 Woodland Avenue, Lynchburg, Va., and associates, which plan early operation of property. New equipment will be installed, including cable conveyor from quarry on other side of James River, and other mechanical-handling machinery. J. W. Seay will be plant manager.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 25 for welded and weldless chain (Schedule 393), spikes, nails and tacks (Schedule 392), rivets and washers (Schedule 389), 30,000 lb. galvanized sheet steel (Schedule 385), cotter pins, taper pins and escutcheon pins (Schedule 388), bolts and nuts, steel and lag screws (Schedule 370), hinges (Schedule 390) all for Eastern and Western navy yards; 20,000 lb. aluminum alloy (Schedule 404) for Norfolk yard; 17 sets steel forward deck houses (Schedule 382) for Boston, Brooklyn, Philadelphia and Puget Sound yards; five oil-burning blacksmiths' forges (Schedule 395) for Brooklyn, Camden, Philadelphia, Mare Island and Puget Sound yards; steel side locking strips (Schedule 398) for Brooklyn and Puget Sound yards.

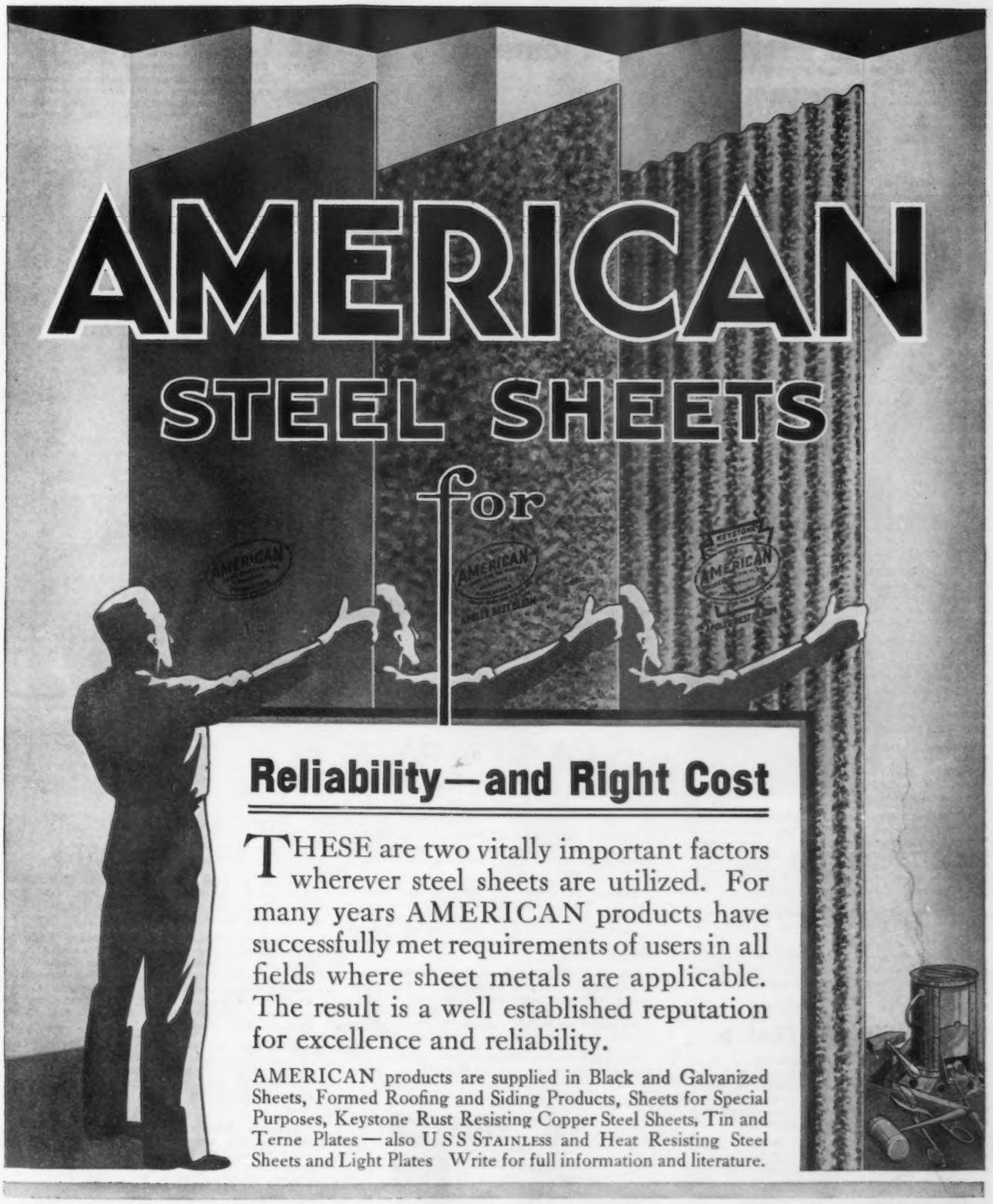
CENTRAL DISTRICT

Hookless Fastener Co., Meadville, Pa., manufacturer of metal fasteners, etc., plans one-story addition. Cost over $150,000 with equipment. Herbert R. Walrath is vice-president and plant manager.

Independent Brewing Co., South Twenty-second Street, Pittsburgh, has let general contract to D. T. Riffle, 1007 Forbes Street, for plant extensions and improvements. Cost over $40,000 with equipment.

West Virginia Brewing Co., Huntington, W. Va., J. Frank Eesenmeier, head, plans extensions and improvements, including additional equipment. Cost about $50,000 with machinery.

City Council, Akron, Ohio, is planning a municipal refuse and garbage incinerator plant. Cost about $325,000 with machinery, including mechanical-handling equipment. Plans are



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GENERAL EXHIBITS BUILDING—A CENTURY OF PROGRESS EXPOSITION

under way for extensions and improvements in municipal waterworks, with pumping machinery, pipe lines, etc. Cost about $231,000.

Euclid Doan Power Co., 1977 East 105th Street, Cleveland, plans addition to power plant, 44 x 60 ft. Cost about $35,000 with equipment. Ralph A. Spengler, 4614 Prospect Avenue, is engineer.

Libbey-Owens-Ford Glass Co., Nicholas Building, Toledo, Ohio, manufacturer of sheet and shatterproof glass products, has let general contract to A. Bentley & Sons, Belmont Street, for addition for shatterproof glass manufacture. Cost about $100,000 with equipment.

Fisher Brass, Inc., Marysville, Ohio, manufacturer of brass and kindred metal products, has plans for one-story addition, 35 x 72 ft.

Renner Products Co., 725 North Forge Street, Akron, Ohio, has awarded general contract to J. M. Limbach, Akron, for addition to brewery. Cost about $30,000 with equipment.

Timken Roller Bearing Co., Canton, Ohio, is increasing production schedule and adding to working force. Plant is now employing 4000 persons as compared with 1700 in March.

T. C. Lindsey, Miami Savings Bank, Dayton, Ohio, is at head of project to erect a brewery, consisting of multi-story brew-house and bottling units, power house and other structures. Cost over $500,000 with equipment. Company will be organized to carry out project. James Stewart Corpn., 343 South Dearborn Street, Chicago, is engineer.

Crawford Valve & Mfg. Co., East Chicago, Ind., has been organized by W. W. Crawford and Frederick C. Crumpacker, East Chicago, capital $250,000, to manufacture valves and other power plant appliances.

Norton Brewing Co., Anderson, Ind., recently reorganized, plans expansion and improvements, including new bottling works. Cost about $175,000 with equipment.

Perfect Circle Co., Hagerstown, Ind., manufacturer of piston rings, etc., has adopted a capacity production schedule at local plant and at branch plant at Newcastle, Ind., with normal working quota.

Old Vincennes Brewery, Inc., Vincennes, Ind., has arranged for increase in capital to $552,200, portion of proceeds to be used for expansion. Bids will soon be asked for extensions and improvements. Additional equipment will be installed. Cost about $150,000 with equipment. M. F. Strauch, 3863 Lincoln Avenue, Chicago, is architect.

Diamond Pattern & Mfg. Co., 702 St. Antoine Street, Detroit, has been organized by Hollis A. Place, 4756 Seminole Avenue, and associates, to manufacture metal patterns and other mechanical devices.

Sebewaing Brewing Co., Sebewaing, Mich., will soon take bids for extensions and improvements, including addition for bottling department. New equipment will be installed. Cost about $150,000 with machinery. Company was organized recently by William B. Wreford, 607 Shelby Street, Detroit, and associates.

United States Engineer Office, Detroit, asks bids until July 25 for one paving breaker (Circular 1).

Ternstedt Mfg. Co., 6307 West Fort Street, Detroit, manufacturer of automobile hardware, has taken out permit for one-story addition.

SOUTH CENTRAL

Dixie Oil Refining Co., Jackson, Miss., E. H. Condon, president, lately organized, will soon begin erection of new oil refinery on waterfront, primarily for gasoline production. Cost close to $100,000 with storage and distributing plants for crude and refined products.

Pruden Coal & Coke Co., Pruden, Tenn., plans rebuilding two tipples at coal-mining properties and power house, recently damaged by tornado, including industrial housing development. Fund of $100,000 has been arranged for work.

Schenley Products Co., Clark Building, Pittsburgh, distiller, has purchased distillery of James E. Pepper Co., Lexington, Ky., for $800,000. Plant has been inactive for some time. New owner plans improvements, including equipment.

Water and Sewer Department, Shreveport, La., Thomas L. Amiss, superintendent, plans installation of pumping machinery and auxiliary equipment for extensions and improvements in systems. Cost about $300,000 with pipe lines, equipment, etc.

Constructing Quartermaster, Fort Knox, Ky., plans call for bids soon for new ordnance shops at field, cost $76,000 with equipment; quartermaster equipment storage and distributing building, $55,000; telephone system, $18,000.

SOUTHWEST

County Urban Water Co., 114 West Tenth Street, Kansas City, Mo., W. Malcom Lowry, president, has arranged financing for $255,000 for installation of water system for different communities in Clay and Platte counties, Mo., to include pumping plants, steel pressure towers, pipe lines, etc. Henrici-Lowry Engineering Co., address noted, is consulting engineer.

Continental Supply Co., 1501 Locust Street, St. Louis, gas and oil well supplies and equipment, has taken over three floors in building at Lane and Commerce Streets, Dallas, Tex., for storage and distribution. St. Louis plant will be removed to new location.

Tulsa Brewing Co., Beacon Life Building, Tulsa, Okla., M. J. McNulty, Jr., 1653 East Twelfth Street, president, has engaged A. M. Atkinson, Thompson Building, architect, to draw plans for new two- and six-story plant on 4-acre tract; main unit will be 80 x 210 ft. Power house and machine shop will be built. Cost over $400,000 with machinery.

Constructing Quartermaster, Fort Leavenworth, Kan., will ask bids soon for completion of hangar with shop and reconditioning facilities, cost $50,900; extensions and improvements in electrical system, railroad line, water and sewage systems, $110,788.

Board of Education, 400 North Walnut Street, Oklahoma City, Okla., J. G. Stearley, clerk, plans manual training department in new high school for colored students. Fund of $200,000 has been arranged.

Common Council, Anthony, Kan., has authorized plans for new municipal electric light and power plants. Cost about $60,000 with equipment. Black & Veatch, Mutual Building, Kansas City, are consulting engineers.

City Council, V. R. Smitham, city manager, Wichita Falls, Tex., is considering municipal electric light and power plant. Cost over $300,000 with equipment.

San Antonio Brewing Association, Avenue A, San Antonio, Tex., has filed plans for extensions and improvements. Cost about $40,000 with equipment. L. M. J. Dielman, 306 East Commerce Street, is architect.

MIDDLE WEST

Consumers Co., 464 North Broadway, Aurora, Ill., plans rebuilding part of artificial ice-manufacturing plant recently destroyed by fire. Loss about $100,000 with equipment.

Schultze Mfg. Co., 306 West Market Street, Bloomington, Ill., has been organized by L. K. Schultze and H. L. Ekin, to manufacture power machinery and parts.

Schuler Chocolate Co., Franklin and Second Streets, Winona, Minn., C. C. Schuler, vice-president and general manager, is planning to remodel part of plant for new brewery. Equipment will be purchased soon. Cost over $50,000.

Moorhead Welding & Machine Works, Moorhead, Minn., recently organized by Ole Rommesmo and associates, has taken over property at 904 First Street for new works. Later it is proposed to install equipment for manufacture of tanks and kindred steel products.

Air Conditioning Systems, Inc., Minneapolis, has been organized, capital $250,000, to manufacture mechanical draft and air-conditioning machinery and parts. James A. Burner, 4740 Stevens Avenue, is head.

George and Mathias Schmich Estates, Freeport, Ill., William H. and Frank Schmich, 1032 South Galena Avenue, in charge, have engaged Fridstein Engineering Co., 228 North La Salle Street, Chicago, engineer, to draw plans for extensions and improvements in brewery, including equipment, at East Stephenson Street and Commercial Avenue. Cost over $200,000 with machinery.

Bureau of Reclamation, Denver, asks bids until Aug. 18 for two or four 82,500-kva. electric generators and for one 40,000-kva. electric generator, each unit complete with main exciter, pilot exciter, thrust and guide bearings, surface coolers and other accessories, for hydroelectric power plant, Boulder Canyon project, Arizona-California-Nevada (Specification 543).

City Council, Thief River Falls, Minn., asks bids until July 25 for new Diesel engine unit and auxiliaries for municipal electric light and power plant. P. G. Federson is city clerk.

City Planning Commission, City Hall, Chicago, Hugh E. Young, 663 West Randolph Street, engineer, has adopted tentative plans for new municipal airport on Lake Michigan waterfront, including hangars, shops, oil storage and distributing plant, administration building and other structures. Cost about $6,000,000.

Great Western Steel Co., 2300 West Fifty-eighth Street, Chicago, which recently acquired U. S. Metal Products Co., has completed plans for a large addition, on which work will begin at once.

Brooks Elevator Co., 109 Chamber of Commerce Building, Minneapolis, has leased part of John Gund Brewing Co. plant at LaCrosse, Wis., and will spend about $50,000 in alterations to convert into malt manufacturing plant.

City Council, Two Rivers, Wis., has approved construction, subject to Federal loan, of following public works: Filtration plant, $85,000; sewage disposal plant, $60,000; intercepting sewers, $40,000; river crossing, $15,000; 500,000-gal. elevated steel tank and tower, $25,000. Jerry Donohue Engineering Co., 608 North Eighth Street, Sheboygan, Wis., has been commissioned to prepare plans. E. J. Donnelly is city manager.

Kurth Malting Co., 4300 West Burnham Street, Milwaukee, has purchased malt plant of Warehousemen's Corpn., Manitowoc, Wis., and will invest $75,000 additional in alterations and new equipment for 24-hr. operation.

National Pressure Cooker Co., 1515 Ball Street, Eau Claire, Wis., has placed contracts for remodeling and enlarging its foundry at cost of $35,000.

PACIFIC COAST

Board of City Trustees, Signal Hill, Cal., William E. Hinshaw, mayor, plans new municipal electric light and power plant. Cost about $250,000 with machinery.

American Brake Shoe & Foundry Co., 74 New Montgomery Street, San Francisco, will take bids on general contract in August for new one-story foundry at South San Francisco plant. Cost about $50,000 with equipment. K. Theill, 580 Market Street, San Francisco, is engineer. Headquarters are at 230 Park Avenue, New York.

Valvoline Oil Co., 124 Centre Street, Los Angeles, is planning extensions in bulk oil storage and distributing plant, with installation of new steel tanks and other equipment. Cost about $28,000. E. E. McNerney is manager.

Schmidt Brewing Co., 517 Hollingsworth Building, Los Angeles, has let general contract to Lindgren & Swinerton, 523 West Sixth Street, for new plant at Arcadia, Cal., consisting of three main units for brewhouse, bottling, storage and distribution, respectively, power house and other structures. Cost about $200,000 with machinery.

Oregon Breweries, Inc., Portland, James E. Edminston, head, has plans for new multi-unit plant. Cost over $300,000 with equipment. Richard Ullrich, Smith Tower Annex, Seattle, is engineer in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 25 for seven power-driven sounding machines and spare parts (Schedule 364), eight copper nickel alloy liners (Schedule 376) for Mare Island Navy Yard; 5000 lb. steel welding electrodes (Schedule 384), 37,000 lb. brass pipe (Schedule 377) for Puget Sound yard; 11,292 galvanized steel buckets for deck and general purpose

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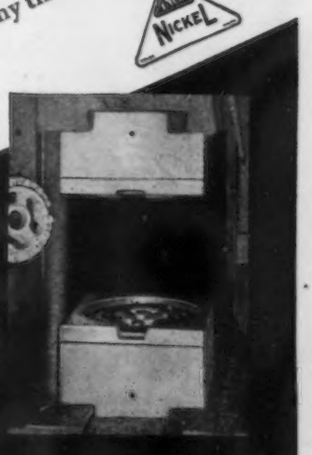

NICKEL ALLOY STEEL

Among the most widely applied materials in manufacturing are Nickel Alloy Steels. Pictured at the right is a set of Nickel Alloy Steel die blocks used by a prominent manufacturer of drop forgings. Nickel Alloy Steel is used because of its unusual strength and toughness and high resistance to shock.

(Schedule 380) for Mare Island and Puget Sound yards.

Nelli Art Bronze Foundry, Inc., 2313 Garnett Street, Los Angeles, has plans for new one-story foundry, 47 x 85 ft. Arthur W. Hawes, 1047 South Orange Grove Avenue, is architect.

Spokane Brewing & Malting Co., West 901 Broadway, Spokane, Wash., has approved plans for extensions and improvements, including new power department, 25 x 65 ft., and other units. New machinery will be installed. Cost over $100,000 with equipment. G. A. Pehrson, Old National Bank Building, is architect.

◀ FOREIGN ▶

Anglo-Newfoundland Development Co., Ltd., London, England, operating pulp and paper mills at Bishop's Falls and Grand Falls, Newfoundland, is arranging new bond issue of £1,750,000 (about $8,250,000), large part of fund to be used for erection of new pulp and newsprint mills in Newfoundland for supply for *London Daily Mail* and affiliated newspapers.

Vertientes Sugar Co., properties at Vertientes and Camaguey, Province of Camaguey, Cuba, including cane sugar mills and mechanical plants, will be offered at public auction at Havana, July 28, under foreclosure proceedings instituted by National City Bank, New York. Plants are appraised at $15,546,900.

Valdivia Corpn., Valdivia, Chile, operating Valdivia blast furnaces, is securing loan from Government of Chile for expansion, including production of iron and steel sheets, steel pipe and kindred products.

TRADE NOTES

Alloy Steel Castings.—Lebanon Steel Foundry, Lebanon, Pa. Pamphlet giving analyses and, in some cases, fields of use, of a wide range of steel castings, with different combinations of chromium, nickel, molybdenum, manganese and vanadium, including the stainless group for high temperature and high corrosion resistance and a new member of the Circle-L family of castings of the company, this one being a 5 per cent chromium alloy with molybdenum, serving particularly the oil industry.

W. B. W. Tool Co., Dayton, Ohio, has recently moved into larger quarters at 215 South Clinton Street. R. W. Wirshing is vice-president and general manager.

Poole Foundry & Machine Co., Woodberry, Baltimore, has appointed McVoy-Hausman Co., Brown-Marx Building, Birmingham, selling representative in Alabama for its flexible couplings.

American System of Reinforcing has discontinued its Milwaukee office and G. W. McKown, local representative for several years, has established himself independently, continuing to occupy offices at 953 Empire Building, 710 North Plankinton Avenue. Before joining American System, Mr. McKown represented Corrugated Bar Co. in Milwaukee for several years.

Inland Steel is the title of a handsome 32 page book, bound in metallized covers, issued by Inland Steel Co., 38 South Dearborn Street, Chicago. Printed in color and profusely illustrated this book describes the company's exhibit at the Century of Progress, and also includes an interesting description of steel making from ore to finished product.

H. A. Brassert & Co., engineers and contractors, Chicago, have received an order from Republic Steel Corpn. for remodeling one of their blast furnace gas washers, also for installing a Research Corporation Cottrell electrical precipitator for fine cleaning the blast furnace gas at No. 2 furnace at their Hazelton plant, Youngstown, Ohio. This is the first unit to be installed at this plant to clean blast furnace gas for metallurgical purposes.

Bulletin Surveys Iron Ore Distribution for 1932

In a bulletin recently published, the Lake Superior Iron Ore Association outlines the distribution of Lake Superior iron ores for the 1932 season. During that period, ore mined totaled approximately 3.5 million tons, over half of which came from the Mesabi range. The next largest producing district was Gogebic range with almost one million tons and the remaining tonnage was fairly evenly distributed among the Vermilion, Cuyuna, Marquette and Menominee ranges.

Marquette shipped about 0.2 million tons directly to Newberry and Wells by rail whereas the remainder traveled by water through the six principal upper Lake ports and thence to lower Lake ports or, in several cases, directly to consuming districts. During the season about 2.7 million tons appeared at the lower ports for redistribution to consumer districts. Cleveland received one million, and Lorain was the next most active port with receipts totaling 0.65 million tons. Toledo was comparatively inactive with 0.08 million tons; the other million tons was shipped in approximately equal allotments to Buffalo, Conneaut, Ashtabula and Huron. About 0.8 million tons was transferred directly from the ranges to Detroit, Indiana Harbor, Gary, South Chicago and Hamilton, Ont., consumers. Detroit smelted 0.2, South Chicago 0.34, and Gary 1.7 million tons. Indiana Harbor and Hamilton, Ont., divided the other 0.11 million tons.

Of the 2.7 million tons unloaded at the lower Lake ports 0.6 and 0.03 million tons were smelted in the immediate Cleveland and Toledo districts respectively. The remaining 2.07 million tons was reshipped—1.1 million to Steubenville, 0.6 million to Pittsburgh, 0.07 million to Ironton and 0.2 million to Buffalo. About 0.06 million tons was smelted in the Valleys. Iron ore unloaded at Cleveland was shipped to all the above consuming districs, whereas each of the other Lake ports served consumers only in the vicinity of the port.

Of less importance than Superior ores, but nevertheless of great interest, are the ore sources of consumers located in eastern Pennsylvania and Maryland, northeastern New York, Pittsburgh and Youngstown. During the 1932 season these districts received 0.07 million tons from Pennsylvania mines and 0.04 million tons from New York and New Jersey mines. About 5.87 million tons was imported from foreign producers. Chile, the largest shipper, sent 0.22 million tons. About 0.15 million tons was unloaded from the U.S.S.R. and 0.12 million from Norway and Sweden. During the season smelters in the East received 0.01 million tons from Africa. Practically 90 per cent of the foreign ore docked at Sparrows Point; New York, Philadelphia and Mobile were points of entry for the remaining 10 per cent.

Of the 4.22 million tons distributed throughout the North Atlantic and Central States in the 1932 season, 83.4 per cent came from Lake Superior ranges, 13.9 per cent from foreign mines and 2.7 per cent was taken from domestic workings in eastern United States.

Preliminary 1932 Data, Canadian Iron and Steel

Preliminary figures compiled by the Dominion Bureau of Statistics at Ottawa indicate that the production of iron and steel and their manufacture was valued at $249,699,658 in 1932 as compared with $374,725,068 in 1931.

Reports were received from 1237 establishments in 1932. These concerns gave employment to an average of 77,505 persons and paid to these workers a total of $87,086,409 in salaries and wages. Materials used in manufacturing cost $112,758,046 and the value added by manufacturing was $136,941,612.

Plants in the iron and steel industry have been classified in 14 main industrial groups, arranged according to the principal products manufactured, and each of these groups reported lower output values in 1932 than in the previous year. The principal declines by industries in millions of dollars were as follows: railway rolling stock fell to $40.87 from $67.86, primary iron and steel to $16.19 from $36.9, automobiles to $43.8 from $59.67, castings and forgings to $35.89 from $51.45, bridge-building and structural steel work to $7.4 from $22.17, sheet metal products to $29.66 from $39.00, machinery to $27.2 from $34.49, agricultural implements to $6.00 from $11.17, wire and wire goods to $11.00 from $14.19, auto parts and accessories to $9.99 from $12.6, and hardware and tools to $11.79 from $13.27. The boiler, tank and engine industries, the bicycle industry and the miscellaneous iron and steel industries also showed minor losses.

Pittsburgh Steel Co. announces the appointment of Edgar T. Ward's Sons Co. as distributers for "Pittsburgh Seamless" steel boiler tubes in Newark, N. J., and Pittsburgh territories. Ample stocks of all standard sizes will be maintained at both centers.

Here's Good BUY-ology for Hot-Rolled Sheets

CHOOSE either Armco Hot-Rolled Sheets or Hot-Rolled and Annealed Sheets. You can specify sturdy steel or, for a slight additional cost, rust-resisting INGOT IRON. Then, to meet your express purpose, the grade will be given special processing . . . practically "tailored" to your individual needs.

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We should like to talk with you about your hot-rolled sheet requirements, especially if you have a problem in production or saleability. Put the question to our nearest office and look for prompt, helpful action. It is listed below.

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ARMCO

ARMCO HOT-ROLLED SHEETS
Made to fit the need
-- and fit it properly

Performance of Stainless Steels

(*Concluded from Page* 19)

luster well. The stainless steel on the Empire State Building has preserved its original luster even better than that on the Chrysler Building, an index of the increase in knowledge of the art obtained in the year which intervened between the erection of the Chrysler Building and that of the Empire State Building.

An unusual instance of corrosion on the Empire State Building should be reported, as illustrating how a set of untoward conditions may wreak havoc in even the most corrosion-resistant materials. Shortly after the building was completed, large patches of red rust appeared all over the surface. This was most unexpected, because the steel had been tested under severe conditions prior to installation on the building. Test coupons cut from every one of the sheets had withstood 100 hr. in the salt spray test without any signs of rusting. This test is so severe that it will discover any surface defects in the steel.

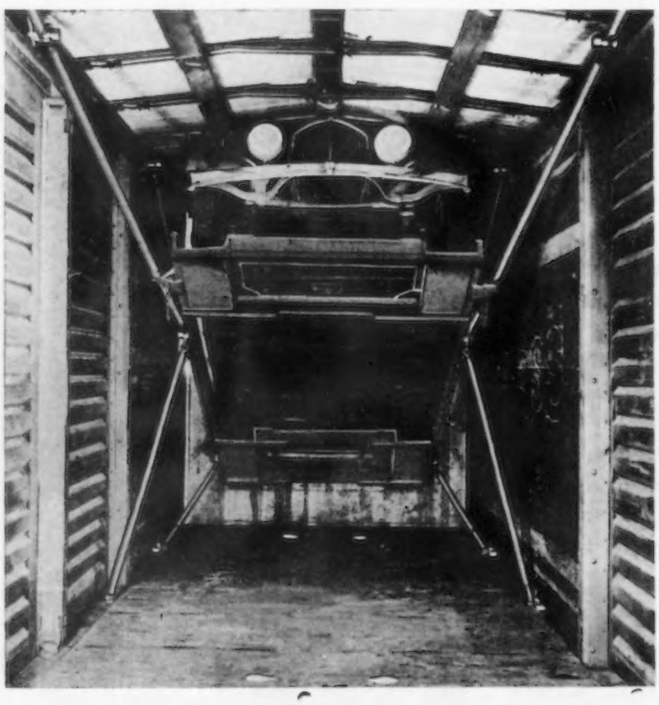
Careful study of the rust on the building showed it to be due to an unexpected circumstance. Rain storms had washed some corroding agents out of the concrete, together with some of the iron rust from the structural steel, and this had run down on to the stainless steel. As a result, patches of rust as large as one's hand were found in numerous places on the stainless steel all over the exterior of the building. The corroding agents from the cement caused the stainless steel to be mildly affected. When it was discovered that this was the cause of the rust spots, it was hoped that after a short time the intermittent rains would wash out substantially all of the corroding agents from the concrete and that the rusting would then stop. This conjecture proved to be correct. The stainless steel was washed and wiped a few times at intervals of several months, and corrosion finally stopped.

Why Other Elements Are Sometimes Used

On the whole the basic properties of the stainless steel are determined by the chromium and the nickel. It may be of interest, however, to list some of the effects of other alloys, when these are added to the regular stainless steels. Molybdenum has been used in amounts up to about 3 per cent for improving certain kinds of acid resistance. Copper has likewise been used in amounts up to 1 per cent in an attempt to improve certain acid resistance. Tungsten has been used in amounts up to about 3 or 4 per cent to increase the strength at elevated temperatures. Silicon has been used in amounts up to 2 per cent to improve the resistance to oxidation or scaling at elevated temperatures. Manganese has been used in various amounts from 2 to 8 per cent to improve the ductility.

An important recent development is the use of titanium to reduce intergranular corrosion. This intergranular corrosion, which at the same time causes a drastic loss of ductility (embrittlement), is a special type of deterioration which may set in when 18-8 stainless has been heated in the range of approximately 1200 to 1400 deg. F. Its nature is perhaps too involved to be discussed at length here, and it may suffice to say that it is a secondary effect arising from the precipitation of carbides which is the primary effect of this heating. The addition of certain small amounts of titanium prevents the secondary effect, although the primary effect (the precipitation of carbides) still takes place. A similar improvement may be obtained from vanadium, although it is not as effective as titanium.

Many of these special alloys will presumably find their ultimate proper application in the stainless field. For the present, the chromium steels and the chromium-nickel steels are already on a sound production basis and have become an established part of our everyday life.



A NUMBER of railroads are installing this auto-loader. It consists of two steel frames which support two cars in elevated position, permitting two more cars to be loaded on the floor. When not in use, frames and floor devices can be retracted into car roof and floor.

By doing away with all dunnage and considerable handling, this device is said to lower shipping costs approximately $34.00 per freight car to dealers and $3.00 per freight car to manufacturers. It is being made by the Evans Products Co., Detroit.

New Materials from the User's Standpoint

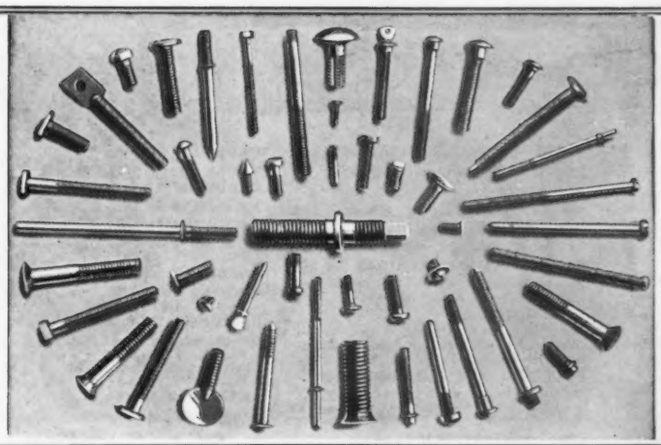
(*Concluded from Page* 18)

materials become automatically defined according to state and form and, further, by the method of production.

Discussion

During the discussion of this paper it was stressed that waste involves not only material, but labor as well. Scrap is another important item for the reason that too little attention is given to it except in a very general sense. It was stated that some manufacturers actually make a living off of the rejections of others. If this can be done, then why cannot those who make the rejections either modify specifications that may be entirely too rigid or find some other use for the material, rather than take loss at scrap prices?

Sometimes a new material or process is grabbed and put into the shop too quickly, the results being losses of both labor and material. It was urged that principles of design and methods of use first be developed to a practical basis before passing untried things to the shop.



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1"	$5.75	$5.25	$4.75	$4.38	$4.13	$4.00
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3"	15.75	14.25	13.13	12.38	12.00	11.63
4"	19.00	17.50	16.50	16.00	15.50	15.00
5"	23.75	21.88	20.63	20.00	19.38	18.75
6"	28.50	26.25	24.75	24.00	23.25	22.50
8"	35.00	33.00	32.00	32.00	30.00	29.00
⅓ page	46.67	44.00	42.67	42.67	40.00	38.67
12"	52.50	49.50	48.00	46.50	45.00	42.00
½ page	66.00	64.00	64.00	62.00	58.00	54.00
1 page	128.00	128.00	124.00	120.00	108.00	100.00

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ACCUMULATORS—Hydraulic
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Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.

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ALLOYS—Calcium-Silicon
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium
Dow Chemical Co., Midland, Mich.

ALLOYS—Phosphor Bronze
Phosphor Bronze Smelting Co., Philadelphia.

ALLOYS—Silico-Manganese
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Titanium
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

ALLOYS—Tungsten
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Zinc Base Die Casting
New Jersey Zinc Co., Inc., The, 160 Front St., N. Y. C.

AMMONIA RECOVERY PLANTS
Koppers Construction Co., The, Ptgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
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ANODES—Cadmium
Udylite Process Co., Detroit.

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BALLS—Steel, Brass or Bronze
New Departure Mfg. Co., Bristol, Conn.
S K F Industries, Inc., 40 E. 34th St., N. Y. C.

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BEARINGS—Oilless
Rhoades, R. W. Metaline Co., Inc., Long Island City, N. Y.

BEARINGS—Radial
Bantam Ball Bearing Co., South Bend, Ind.
S K F Industries, Inc., 40 E. 34th St., N. Y. C.

BEARINGS—Roller
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
S K F Industries, Inc., 40 East 34th St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
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Timken Steel & Tube Co., The, Canton, O.

BEARINGS—Roller Tapered
Timken Roller Bearing Co., Canton, O.
Timken Steel & Tube Co., The, Canton, O.

BEARINGS—Shaft Hanger
S K F Industries, Inc., 40 East 34th St., N. Y. C.

BEARINGS—Thrust
S K F Industries, Inc., 40 East 34th St., N. Y. C.
Timken Roller Bearing Co., Canton, O.
Timken Steel & Tube Co., The, Canton, O.

BELT—Dressing
Spider Webb Co., The, Buffalo, N. Y.

BELT FASTENERS
Clipper Belt Lacer Co., Grand Rapids, Mich.

BELT LACER
Clipper Belt Lacer Co., Grand Rapids, Mich.

BELTING—Metal, Conveyor, High and Low Temperature
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

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Goodrich, B. F., Rubber Co., Akron, Ohio.

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BENDING MACHINES—Hand and Power
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Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon Vanadium Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Nickel Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Steel
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BILLETS—Die Block Steel
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Andrews Steel Co., The, Newport, Ky.

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Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

BIMETAL—Thermostatic
Chace, W. M., Valve Co., Detroit, Mich.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

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BLOWERS—Centrifugal
General Electric Co., Schenectady, N. Y.

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Acme Mchry. Co., Cleveland, O.
Landis Mch. Co., Inc., Waynesboro, Pa.
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Acme Machinery Co., Cleveland.
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BOLTS—Special
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Track
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.

BOLTS AND NUTS
Ames, W., & Co., Jersey City, N. J.
Clark Bros. Bolt Co., Millidale, Conn.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Youngstown, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BORING BARS
Bullard Co., The, Bridgeport.

BORING, DRILLING AND MILLING MACHINES—Horizontal
Schiess-Defries A.-G. Düsseldorf, Germany.

BORING & DRILLING MACHINES—Vertical
Bullard Co., The, Bridgeport.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport.
Schiess-Defries A.-G. Düsseldorf, Germany.

BOXES—Paper, Metal Edge
National Metal Edge Box Co., 1208 Callowhill St., Philadelphia.

BRAKES—Electric & Mechanical
Electric Controller & Mfg. Co., Cleveland.

BRAKES—Metal Forming
Dreis & Krump Mfg. Co., Chicago.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.

BRIDGE BUILDERS
American Bridge Co., Pittsburgh.
Belmont Iron Works, Philadelphia.
McClintic-Marshall Corp., Bethlehem, Pa.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BRONZE—Phosphor
Phosphor Bronze Smelting Co., Philadelphia.
Seymour (Conn.) Mfg. Co.

BUCKETS—Clamshell
Blaw-Knox Co., Pittsburgh
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUILDINGS—Steel
American Bridge Co., Pittsburgh.
Belmont Iron Works, Philadelphia.
McClintic-Marshall Corp., Bethlehem, Pa.

BUSHINGS—Brass and Bronze
Bunting Brass & Bronze Co., Toledo, O.
Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Phosphor Bronze Smelting Co., Philadelphia.

BY-PRODUCTS COKE & GAS OVENS
Koppers Construction Co., The, Ptgh.

CABLE—Electric
General Electric Co., Schenectady, N. Y.

CABLEWAYS AND TRAMWAYS—See Tramways

CADMIUM
Udylite Process Co., Detroit.

CADMIUM PLATING PROCESS
Udylite Process Co., Detroit.

CALCIUM CARBIDE
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIC
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIDE ALLOYS
Ramet Corp. of America, North Chicago, Ill.

CARBURIZING—See Heat Treating

CARS—Dump
Atlas Car & Mfg. Co., Cleveland.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Huskins Mfg. Co., Detroit, Mich.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Alloy Steel
Bissett Steel Co., The, Cleveland.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Brass, Bronze, Copper or Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.
Phosphor Bronze Smelting Co., Philadelphia.
Snyder, W. P., & Co., Pittsburgh.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum Bronze
Aurora (Ill.) Metal Co., Inc.

CASTINGS—Electric Steel
Industrial Steel Casting Co., The, Toledo.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.
Farquhar, A. B., Co., Ltd., York, Pa.
Midvale Co., The, Nicetown, Phila., Pa.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa

CASTINGS—Magnesium Alloys
Dow Chemical Co., Midland, Mich.

CASTINGS—Malleable
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Peoria (Ill.) Malleable Castings Co.
Timken Roller Bearing Co., Canton, Ohio.
Timken Steel & Tube Co., The, Canton, O.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
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Bethlehem (Pa.) Steel Company.
Crucible Steel Castings Co., Lansdowne, Pa.
Industrial Steel Casting Co., The, Toledo.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Machine Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

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Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.

CEMENT—Rubber
Goodrich, B. F., Rubber Co., Akron, Ohio.

CHAINS—Power Transmission
Boston Gear Wks., Inc., Norfolk Downs, Mass.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Noble & Westbrook Mfg. Co., Hartford, Ct.

CHEMICALS—Rust Proofing
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
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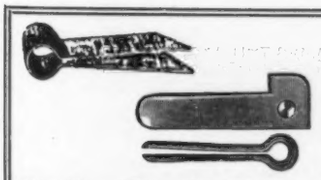

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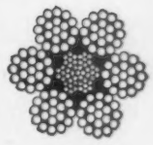
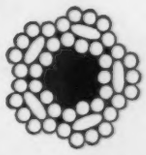
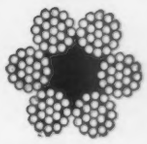
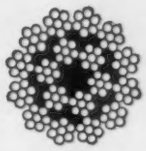

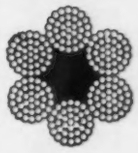
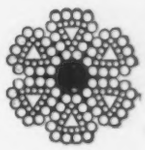

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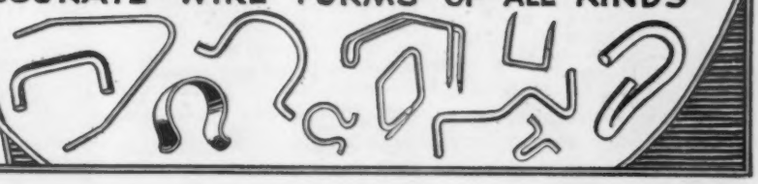

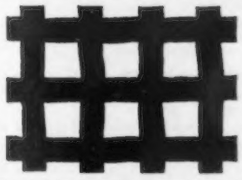

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Westinghouse Traction Brake Co., Industrial Div., Pittsburgh.

COMPRESSORS—Gas
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Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., Alliance, O.
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Demag Corp., Duisburg, Germany.
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Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
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Mesta Machine Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

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FORGINGS—Upset
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General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp.

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CRANE & HOIST COMPANY, INC.
Division of Manning, Maxwell & Moore, Inc.
MUSKEGON MICHIGAN

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Pittsburgh (Pa.) Rolls Corp.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

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Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

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Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

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Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

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Jones & Lamson Mch. Co., Springfield, Vt.
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LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

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Waldrich, H. A., Siegen, Germany.

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Mesta Machine Co., Pittsburgh.

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ones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

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LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., Cleveland.

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Socony - Vacuum Corp., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

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Socony - Vacuum Corp., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Socony - Vacuum Corp., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

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Socony - Vacuum Corp., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

LUBRICANTS—Mining Machines
Socony - Vacuum Corp., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Socony - Vacuum Corp., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

LUBRICANTS—Roll Neck—Anti-Friction & Plain
Socony - Vacuum Corp., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

LUBRICANTS—Tipple & Cleaning
Socony - Vacuum Corp., 26 Broadway N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

MACHINE WORK
Cowdrey Mch. Wks., 30 Summer St., Fitchburg, Mass.
Elsler Electric Corp., 765 South 13th St., Newark, N. J.
Farquhar, A. B., Co., Ltd., York, Pa.
Read Mchry. Co., Inc., York, Pa.
Torrington (Conn.) Mfg. Co., The.

MACHINERY DEALERS
Crawford, F. H., & Co., 50 Church St., N. Y. C.
Delta Equipment Co., Philadelphia.
Donahue Steel Prods. Co., 1609 W. 74th St., Chicago.
Eastern Mchry. Co., 3263 Spring Grove Ave., Cincinnati, O.
Freese Material Equipment Co., Chicago, Ill.
Iroquois Mchry. Co., 656 Ohio St., Buffalo, N. Y.
Lucas, J. L., & Son, Inc., Bridgeport, Ct.
Marr-Galbreath Mchry. Co., Pittsburgh.
Miles Mchry. Co., Saginaw, W. S., Mich.
Morey & Co., Inc., 410 Broome St., N. Y. C.
Morris Machinery Co., Inc., Newark, N. J.
Moyer, J. N., Phila.
O'Brien Machinery Co., Philadelphia.
Rockford (Ill.) Power Mchry. Co., 623 Sixth St.
Ryerson, Joseph T., & Son, Inc., Chicago
Simmons Mch. Tool Corp., Albany, N. Y.
White, A. D. Mchry. Co., Chicago.
Winternitz, Samuel L. & Co., Chicago.

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Carborundum Co., The, Perth Amboy, N. J.

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Dow Chemical Co., Midland, Mich.

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Electric Controller & Mfg. Co., Cleve.

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Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

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METAL PARTS—Rubber Covered
American Hard Rubber Co., 11 Mercer St., N. Y. C.

METAL SPECIALTIES
Amer. Spring & Mfg. Corp., Holley, Mich.
Bossert Corp., The, Utica, N. Y.
Crosby Co., The, Buffalo, N. Y.
Cuyahoga Spring Co., Cleve.
Torrington (Ct.) Co.
Worcester (Mass.) Stamped Metal Co.

METALS—Acid and Corrosion Resistant
Haynes Stellite Co., 30 East 42nd St., N. Y. C.

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Eastern Mchry. Co., 3263 Spring Grove Ave., Cincinnati, O.

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National Engineering Co., Chicago.

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Arcado Mfg. Co., Freeport, Ill.

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Arcade Mfg. Co., Freeport, Ill.

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International Nickel Co., Inc., 67 Wall St., N. Y. C.

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Allis-Chalmers Mfg. Co., Milwaukee.
Lincoln Electric Co., Cleveland.

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Botwinik Brothers, Inc., New Haven, Conn.
Delta Equipment Co., Philadelphia.
O'Brien Machinery Co., Philadelphia.

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Wickwire Brothers, Cortland, N. Y.
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NICKEL
International Nickel Co., Inc., 67 Wall St., N. Y. C.

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Lukens Steel Co., Coatesville, Pa.

NICKEL ANODES—Rolled or Cast
Seymour (Conn.) Mfg. Co.

NICKEL SILVER
Seymour (Conn.) Mfg. Co.

NITROGEN
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National Mchry. Co., Tiffin, Ohio.

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NUTS—Cold Punched
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Semi-Finished
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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OILS—Cutting
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Sun Oil Co., Philadelphia.
Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

OILS—Fuel
Socony - Vacuum Corp., 26 Broadway, N. Y. C.
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Tide Water Oil Sales Corp., 17 Battery Place, N. Y. C.

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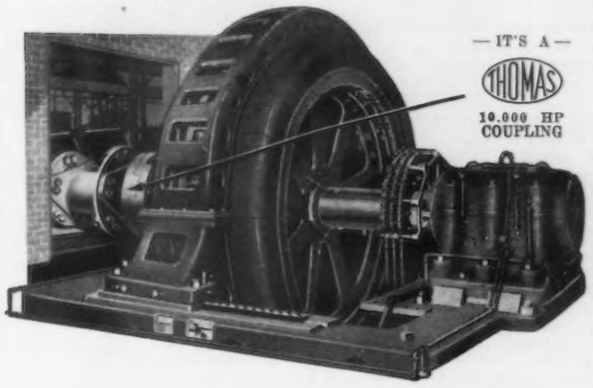

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SERVICE STATIONS IN PRINCIPAL CITIES FROM COAST TO COAST

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Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Lukens Steel Co., Coatesville, Pa.
Ryerson, Joseph T. & Sons, Inc., Chicago.
Tennessee Coal Iron & Railroad Co., Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co.

PLATES—Nickel-Clad Steel
Lukens Steel Co., Coatesville, Pa.

PLATES—Wide Steel (up to 199 in.)
Lukens Steel Co., Coatesville, Pa.

PLATES—Steel, Welding Quality
Lukens Steel Co., Coatesville, Pa.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., Pontiac, Mich.

POLISHING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., Courtland, N. Y.
Crosby Co., The, Buffalo, N. Y.

PRESSED STEEL PARTS
Bossert Corp., The, Utica, N. Y.
Crosby Co., The, Buffalo, N. Y.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.

PRESSES—Drop—See Hammers—Drop

PRESSES—Coining
National Mchry. Co., Tiffin, Ohio.

PRESSES—Foot
Baird Machine Co., Bridgeport, Conn.

PRESSES—Forging
Mesta Machine Co., Pittsburgh.
Morgan Engineering Co., Alliance, Ohio.

PRESSES—Forming and Bending
Dreis & Krump Mfg. Co., Chicago.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Mesta Machine Co., Pittsburgh.
Morgan Engineering Co., Alliance, O.
Robertson, John, Co., 123 Water St., Brooklyn, N. Y.
Wood, R. D., & Co., Philadelphia.

PRESSES—Power
Baird Machine Co., Bridgeport, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyman, Joseph, & Sons, Phila.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry, & Co., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
V & O Press Co., Hudson, N. Y.

PRESSES—Trimming
Erie (Pa.) Foundry Co.

PRINTING MACHINES—Copying
Paragon-Revolute Corp., 69 South Ave., Rochester, N. Y.

PUMPS—Hydraulic
Robertson, John, Co., 123 Water St., Bklyn., N. Y.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Bertsch & Co., Cambridge City, Ind.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
Pels, Henry, & Co., 90 West St., N. Y. C.
Quickwork Co., The, St. Marys, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Schatz Mfg. Co., The, Poughkeepsie, N.Y.
Thomas Spacing Mach. Co., Pittsburgh.

PYROMETERS—Indicating
Bristol Co., Waterbury, Conn.
Hoskins Mfg. Co., Detroit, Mich.

RADIATION—Concealed Copper
Wolverine Tube Co., Detroit.

RAIL SPLICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Robinson & Orr, Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton (W. Va.) Steel Co.

RAILS—Relaying
Hyman-Michaels Co., Chicago.

REAMERS
Morse Twist Drill & Mch. Co., New Bedford, Mass.

REFRACTORIES—Dolomite
Basic Dolomite, Inc., Cleveland, Ohio.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

REINFORCEMENT FABRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.

RINGS—Welded
American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
Acme Machinery Co., Cleve.
National Mchry. Co., Tiffin, Ohio.

RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES
Shuster, F. B., Co., New Haven, Conn.
Townsend, H. P., Mfg. Co., Hartford, Conn.

RIVETS
Champion Rivet Co., Cleveland, Ohio.
Clark Bros. Bolt Co., Milldale, Conn.
Oliver Iron & Steel Corp., Pittsburgh.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago.

RODS—Brass, Bronze, Copper or Nickel Silver
Scovill Mfg. Co., Waterbury, Conn.

RODS—Magnesium Alloys
Dow Chemical Co., Midland, Mich.

RODS—Nickel Silver
Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze
Phosphor Bronze Smelting Co., Philadelphia.
Seymour (Conn.) Mfg. Co.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Steel & Wire Co., Chicago.
Champion Rivet Co., Cleveland.
Haynes Stellite Co., 30 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Pittsburgh (Pa.) Steel Co.
Wilson Welder & Metals Co., Inc., North Bergen, N. J.

RODS—Wire
American Steel & Wire Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co.

ROLLING MACHINERY—Cold Rolling
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Demag Corp., Duisburg, Germany.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Machine Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
United Engineering & Fdry. Co., Ptgh.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Sand Chilled Iron and Steel
Hyde Park (Pa.) Fdry. & Mach. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Machine Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engng. & Fdry. Co., Ptgh.

ROLLS—Special Hardened
Midvale Co., The, Nicetown, Phila., Pa

ROOFING—Special Copper Bearing Steel
Newport (Ky.) Rolling Mill Co.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Newport (Ky.) Rolling Mill Co.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co.

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Newport (Ky.) Rolling Mill Co.

ROOFING AND SIDING—Iron and Steel
Newport (Ky.) Rolling Mill Co.

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New Jersey Zinc Co., Inc., The, 160 Front St., N. Y. C.

RUBBER LININGS—Tank
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
American Hard Rubber Co., 11 Mercer St., N. Y. C.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Process Co., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST REMOVING
American Chemical Paint Co., Ambler, Pa.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

SAND—Sand Blast
Cape May (N. J.) Sand Co.

SAND—Steel Molding
Cape May (N. J.) Sand Co.

SAND BLAST EQUIPMENT AND MACHINES
Arcade Mfg. Co., Freeport, Ill.
Pangborn Corp., Hagerstown, Md.

SAND BLAST STEEL SHOT
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
National Engineering Co., Chicago.

SAND MILLS
National Engineering Co., Chicago.

SAWING MACHINES—Band for Wood or Metal
Victor Saw Works, Inc., Middletown, N. Y.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Disston, Henry, & Sons, Inc., Philadelphia

SAWS—Friction
Disston, Henry, & Sons, Inc., Philadelphia

SAWS—Hack Saw Blades
Victor Saw Works, Inc., Middletown, N. Y.

SAWS—Hot Metal
Disston, Henry, & Sons, Inc., Philadelphia

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia
Taber Mfg. Co., Philadelphia.

SAWS—Milling
Disston, Henry, & Sons, Inc., Philadelphia

SCREENS—Perforated Metal
Harrington & King Perforating Co., Chi.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
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Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven, Ct.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic
Cone Automatic Mach. Co., Inc., Windsor, Vt.
Townsend, H. P., Mfg. Co., Hartford, Conn.

SCREW MACHINERY—Hand
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
Cone Automatic Mach. Co., Inc., Windsor, Vt.

SCREW MACHINERY—Wood
Townsend, H. P., Mfg. Co., Hartford, Conn.

SCREW STOCKS
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Machine
Progressive Mfg. Co., The, Hartford, Conn.

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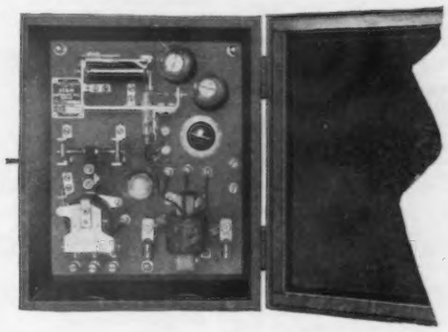

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SCREWS—Safety Set
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Standard Pressed Steel Co., Jenkintown, Pa.
Strong, Carlisle & Hammond Co., Cleve.

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Strong, Carlisle & Hammond Co., Cleve.

SCREWS, Socket, Head, Cap
Standard Pressed Steel Co., Jenkintown, Pa.

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Botwinik Brothers, Inc., New Haven, Ct.
Donahue Steel Prods. Co., 1609 W. 74th St., Chicago.
Eastern Machinery Co., 3263 Spring Grove Ave., Cincinnati, O.
Freese Material Equipment Co., Chicago, Ill.
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Rockford (Ill.) Power Mchry. Co., 623 Sixth St.
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Quickwork Co., The, St. Marys, Ohio.
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Inland Steel Co., Chicago.
National Steel Corp., Pittsburgh.
Newport (Ky.) Rolling Mill Co.
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Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co.

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Newport (Ky.) Rolling Mill Co.
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Ryerson, Jos. T., & Son, Inc., Chicago.
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Youngstown (Ohio) Sheet & Tube Co.

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Dow Chemical Co., Midland, Mich.

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Central Iron & Steel Co., Harrisburg, Pa.

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Cleveland (Ohio) Container Co., Abrasive Div.

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Thomas Spacing Mach. Co., Pittsburgh.

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Bullard Co., The, Bridgeport.
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Farquhar, A. B., Co., Ltd., York, Pa.
Morgan Engineering Co., Alliance, Ohio.
Quickwork Co., The, St. Marys, Ohio.
Read Mchry. Co., Inc., York, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

SPECIALTIES—Rubber Covered & Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.

SPEED REDUCERS
Boston Gear Wks., Inc., Norfolk Downs, Mass.
Demag Corp., Duisburg, Germany.
Philadelphia (Pa.) Gear Works.

SPIKES—Track
Ames, W., & Co., Jersey City, N. Y.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.

SPLICE BARS
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.

SPRING MAKING MACHINERY
Baird Machine Co., Bridgeport, Conn.

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American Steel & Wire Co., Chicago.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

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Amer. Spring & Mfg. Corp., Holley, Mich.
American Steel & Wire Co., Chicago.
Barnes-Gibson-Raymond, Inc., Detroit.
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Cook Spring Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Cuyahoga Spring Co., Cleveland.
Dunbar Bros. Co., Bristol, Conn.
Fischer, Chas., Spring Co., 242 Kent Ave., Brooklyn, N. Y.
Gibson, Wm. D., Co., Chicago.
Hubbard, M. D., Spring Co., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Raymond Mfg. Co., Corry, Pa.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
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Barnes, Wallace, Co., The, Bristol, Conn.
Bossert Corp., The, Utica, New York.
Browne-Morse Co., Muskegon, Mich.
Burgess-Norton Mfg. Co., Geneva, Ill.
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Cook, H. C., Co., Ansonia, Conn.
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Cuyahoga Spring Co., Cleveland.
Dunbar Bros. Co., Bristol, Conn.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass.
Foster, Theodore W., & Bro. Co., Providence, R. I.
General Mach. & Mfg. Co., Bridgeport, Ct.
Gibson, Wm. D., Co., Chicago.
Globe Mch. & Stpg. Co., Cleveland.
Hubbard, M. D., Spring Co., Pontiac, Mich.
Lansing (Mich.), Stamping Co., So. Penn Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Parish Pressed Steel Co., Reading, Pa.
Pennsylvania Stamping Corp., York, Pa.
Raymond Mfg. Co., Corry, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Smith, Thomas, Co., 286 Grove St., Worcester, Mass.
Torrington (Ct.) Co.
Torrington (Conn.) Mfg. Co., The.
Veeder-Root, Inc., Hartford, Ct.
Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures
Noble & Westbrook Mfg. Co., Hartford, Ct.

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Wickwire Brothers, Cortland, N. Y.

STEEL—Alloy
Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Firth-Sterling Steel Co., McKeesport, Pa.
Harrisburg (Pa.) Pipe & Pipe Bending Co.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Timken Roller Bearing Co., Canton, Ohio.
Timken Steel & Tube Co., The, Canton, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Alloy, Cold Drawn
Moltrup Steel Products Co., Beaver Falls, Pa.
Union Drawn Steel Co., Massillon, Ohio.
Wycoff Drawing Steel Co., Pittsburgh.

STEEL—Bright Finished
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
Andrews Steel Co., The, Newport, Ky.
Carnegie Steel Co., Pittsburgh.
Firth-Sterling Steel Co., McKeesport, Pa.
Harrisburg (Pa.) Pipe & Pipe Bending Co.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Pipe & Pipe Bending Co.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver
Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Nickel Stainless
Allegheny Steel Co., Brackenridge, Pa.

STEEL—Chrome Stainless
Allegheny Steel Co., Brackenridge, Pa.

STEEL—Chrome Vanadium
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Pipe & Pipe Bending Co.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cold Drawn
American Steel & Wire Co., Chicago.
Bliss & Laughlin, Inc., Harvey, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh.
Moltrup Steel Products Co., Beaver Falls, Pa.
Latrobe (Pa.) Electric Steel Co.
Rathbone, A. B. & J., Palmer, Mass.
Ryerson, Joseph T., & Son, Inc., Chicago
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawing Steel Co., Pittsburgh.

STEEL—Cold Rolled Strips
Acme Steel Co., Chicago.
American Steel & Wire Co., Chicago.
Athenia Steel Co., 135 William St., N. Y.
Griffin Mfg. Co., Erie, Pa.
Inland Steel Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Stanley Works, The, New Britain, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Thomas Steel Co., Warren, Ohio.
Weirton (W. Va.) Steel Co.
West Leechburg Steel Co., Pittsburgh.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Chrome Nickel
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.

STEEL—Cold Rolled Strips, Electric Copper Coated
Thomas Steel Co., Warren, Ohio.

STEEL—Cold Rolled Strips, Electro-Galvanized
Thomas Steel Co., Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated
Thomas Steel Co., Warren, O.

STEEL—Corrosion Resisting
American Steel & Wire Co., Chicago.
Midvale Co., The, Nicetown, Phila., Pa.

STEEL—Crucible
Firth-Sterling Steel Co., McKeesport, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery
Firth-Sterling Steel Co., McKeesport, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die
Andrews Steel Co., The, Newport, Ky.
Disston, Henry, & Sons, Inc., Philadelphia
Firth-Sterling Steel Co., McKeesport, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Drill
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Electric
Disston, Henry, & Sons, Inc., Philadelphia
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Inland Steel Co., Chicago.
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Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., Canton, Ohio.
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STEEL—High Speed
Bethlehem (Pa.) Steel Company.
Firth-Sterling Steel Co., McKeesport, Pa.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Stanley Works, The, New Britain, Ct.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Weirton (W. Va.) Steel Co.
West Leechburg Steel Co., Pittsburgh.

STEEL—Hot Rolled Strips, Electro Zinc Coated
Thomas Steel Co., Warren, O.

STEEL—Magnet
Latrobe (Pa.) Electric Steel Co.

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Coal and Coke
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THE S F CO.

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Republic Steel Corp., Youngstown, O.
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Youngstown (Ohio) Sheet & Tube Co.

TIN PLATE MACHINERY
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Wean Engineering Co., Inc., The, Warren, Ohio.

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Armstrong Bros. Tool Co., Chicago.
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Wood, R. D., & Co., Philadelphia.

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Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Wood, R. D., & Co., Philadelphia.

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Central Iron & Steel Co., Harrisburg, Pa.
Smith, Thomas, Co., 286 Grove St., Worcester, Mass.

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Lukens Steel Co., Coatesville, Pa.

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WELDING MACHINES—Electric Arc
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
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Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Phosphor Bronze Smelting Co., Philadelphia.
Seymour (Conn.) Mfg. Co.

WIRE—Flat, Round, Square or Special Shapes
American Steel & Wire Co., Chicago.
Barnes, Wallace, Co., The, Bristol, Conn.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
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Wickwire Brothers, Cortland, N. Y.

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WIRE NAIL MACHINERY
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WIRE PRODUCTS
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Shuster, F. B., New Haven, Ct.

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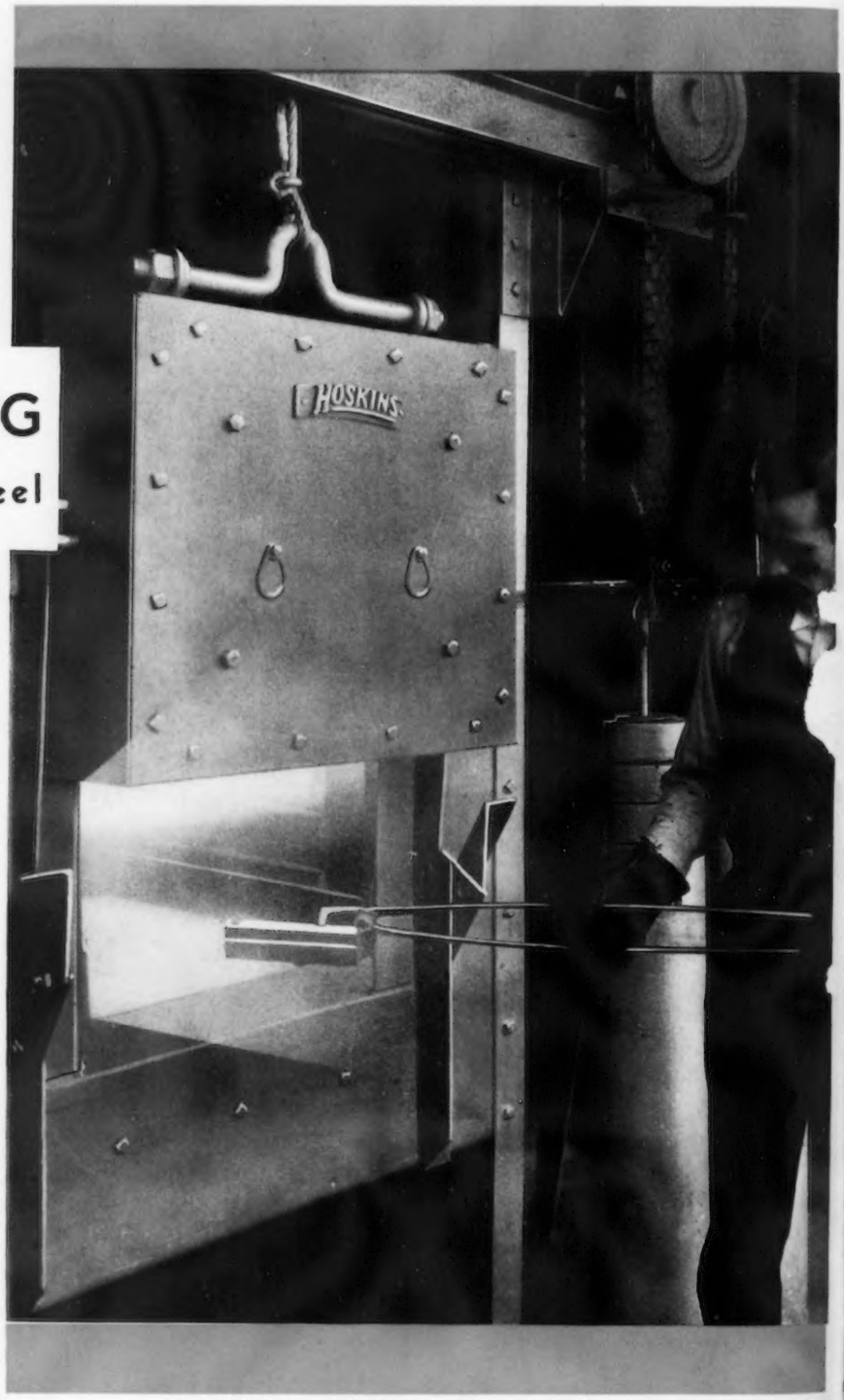

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